

The Goblin Spider Genus *Khamisia* and Its Relatives (Araneae, Oonopidae)

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ABSTRACT

The goblin spider genus *Khamisia* Saaristo and van Harten was based on a single female from Yemen characterized by large lateral extensions of the sternum that widely separate coxae II and III. Three new species, including the first known males of the genus, are described: *K. hayer* from the United Arab Emirates, *K. atlit* from Israel, and *K. holmi* from Kenya. All these species are united by having only two trichobothria on the palpal tibia; *K. hayer* has apparently been introduced into Cape Verde. Other specimens with a similarly modified sternum have been found in Africa, Madagascar, and the Virgin Islands, but differ in having the normal set of three trichobothria on the palpal tibia. The new genus *Khamisina* is established for three new species that also differ in having an abdominal color pattern, a punctate sternum, and uniquely shaped cheliceral setae: *K. kivu* from DR Congo, *K. kilifi* from Kenya, and *K. ibadan* from Nigeria. A second new genus, *Khamiscar*, is established for six new species from Madagascar in which the sternum is widened posteriorly and bears marginal radiating ridges, and the tarsal organs have only a single raised receptor: *K. anta*, *K. maro*, *K. tola*, *K. kiri*, *K. baly*, and *K. ambi*. A third new genus, *Khamisoides*, is established for three bizarre new species from the Virgin Islands (*K. muchmorei* from St. Croix; *K. edwardsi* and *K. calabash* from St. John) that differ in having only two eyes, fused posterior median spinnerets, and female genitalia with a pair of lateral receptacula and anteriorly directed apodemes.

INTRODUCTION

The goblin spider genus *Khamisia* was described by Saaristo and van Harten (2006: 135) for *K. banisad*, a species based on a single female specimen from Yemen notable for “the wide

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lateral outgrowths of the sternum between the second and third coxae" (see figs. 7, 50, 55, 63, 99, 101, 116–118, 125, 142). Since that time, specimens with a similarly modified sternum have been detected from other localities in the Middle East, Africa, Madagascar, and the Virgin Islands. Although relatively few specimens are available, detailed study of them suggests that there are four different genera that share this type of sternal modification, and that they may not constitute a single monophyletic group. As delimited below, *Khamisia* is known only from the Middle East and Kenya, whereas new genera are described for other species from tropical Africa (*Khamisina*), Madagascar (*Khamiscar*), and the Virgin Islands (*Khamisoides*).

All four genera belong to the subfamily Oonopinae, as the males have lost the heavily sclerotized sperm duct in their palps that are found in all spiders other than oonopines. Oonopines are also usually easy to recognize by their rather stereotyped tarsal organ morphology (Platnick et al., 2012a); their tarsal organs are serially dimorphic, with three raised receptors on the anterior legs but only two raised receptors on the posterior legs and pedipalps. Perhaps the most obvious modifications of this general pattern occur within the complex of genera including *Stenoonops* Simon, *Longoonops* Platnick and Dupérré, *Australoonops* Hewitt, *Scaphioides* Bryant, *Hortoonops* Platnick and Dupérré, and *Reductoonops* Platnick and Berniker. Members of those genera typically have the distalmost raised receptor on their tarsal organs bifid, with two lobes originating from a single base (e.g., Platnick and Dupérré, 2010b: figs. 66–70, 2012: figs. 20–24; Platnick and Berniker, 2014a: figs. 25–29).

Members of *Khamisia* and the new genera described below resemble those of the *Stenoonops* complex in their general level of sclerotization (i.e., the carapace is lightly sclerotized, but the abdomen is not, save for small, weakly sclerotized epigastric and postepigastric scuta). However, their tarsal organ morphology is far from stereotyped.

In a female of the new species *Khamisia hayer*, for example, a tarsal organ from leg I shows only two raised receptors (fig. 92), accompanied by what appears to be a pore receptor of the type found in the dysderoid families Dysderidae and Segestriidae, but not previously reported in an oonopid (see Platnick et al., 2012a: 12). The pore receptor also occurs on leg II, where there is also a tiny protrusion that might represent a remnant of the third raised receptor (fig. 93). In this specimen, the tarsal organs on the posterior legs and the pedipalps are narrowed, but appear to have the normal complement of two raised receptors (figs. 94–96).

Males of *K. hayer*, however, seem to have highly variable tarsal organs, sometimes even showing differences between the right and left legs of a single specimen. On leg I, there can be either three or four raised receptors, one of which may be unusually narrow and elongated (figs. 39–41), and there may also be a pore receptor (fig. 41). On leg II, there can be either two or three raised receptors (figs. 42, 43). The tarsal organ on leg III is slightly narrowed, and can have either just the normal two raised receptors or a tiny third raised receptor as well (figs. 44, 45). On leg IV, the tarsal organ is narrower, but seems to have just the normal two raised receptors (figs. 46, 47). On the pedipalp, the tarsal organ is not narrowed, but again can have either two or three raised receptors (figs. 48, 49).

A female of the new African species *Khamisina kivu* has only two raised receptors on each of the legs and on the palps; those raised receptors are both elongated, and the distal one is bifid (figs. 229–233). On legs I and II, there does appear to be a pore receptor just proximal to

the raised receptors (figs. 229, 230). A male has similar raised receptors, and at least leg I may have a pore receptor (figs. 184–188).

In the Malagasy species assigned below to *Khamiscar*, the tarsal organs are even more autapomorphic (figs. 326–330, 363–367, 379, 394–396, 421, 436). The general pattern shows no serial dimorphism; the tarsal organ on each leg and pedipalp has only a single, long raised receptor. There are occasional tiny projections that might be remnants of the other raised receptors (figs. 329, 363). Species of the new genus *Khamisoides*, from the Virgin Islands, show a similar reduction in receptor number; especially on the anterior legs, the single, long raised receptor appears bipartite, with flat proximal and erect distal portions (figs. 526–530, 570–574). There is sometimes evidence of a pore receptor, situated either on or near the flat proximal portion of the raised receptor (e.g., figs. 571, 574), or a remnant of a raised receptor (e.g., fig. 526).

The mouthparts of these taxa are often oddly modified. The cheliceral fang is elongated, as is the venom gland opening on its posterior surface (figs. 6, 65, 148, 205, 295, 340, 498, 541). In the male of the new Kenyan species *Khamisia holmi*, the tips of the fangs are heavily sclerotized (fig. 143) and have a long, ventral excavation (fig. 138). In the African genus *Khamisina*, the cheliceral promargin bears a row of distinctively shaped setae, which resemble a conifer or bottle brush (figs. 147, 204, 261). Males of this genus sometimes have bizarre endites as well, with a procurved prong originating from the base of the dorsal surface (figs. 150–153) or greatly elongated tips (figs. 264–267). In the Virgin Islands *Khamisoides* species, the endites have distinctly narrowed anterior extensions, which vary in length (figs. 479, 543, 582).

The distribution of those Virgin Islands species is unusual. There are other groups of goblin spiders that have multiple species on the Virgin Islands. In some cases, such as *Scaphioides*, there can be multiple species on a single island, but each of those species occurs on multiple islands (see Platnick and Dupérré, 2012). In other cases, such as *Stenoonops*, *Longoonops*, and *Scaphiella* Simon, each species occupies a different island or group of islands, so only one species per genus is known from any given island (see Platnick and Dupérré, 2010a, 2010b; Platnick et al., 2012b). *Khamisoides*, on the other hand, has at least two species that each appear to be endemic to St. John, and they are seemingly allopatric, with one being widespread on the island, except for the Calabash Boom area occupied by the second.

Trans-Atlantic relationships have already been observed in this group of genera; the South African genus *Australoonops*, for example, appears to be closely related to the Neotropical genus *Stenoonops* (see Platnick and Dupérré, 2010b). Whether the species considered here represent a similar case (i.e., whether the large sternal extensions separating coxae II and III represent a synapomorphy uniting the four genera treated here) remains an open question. Some evidence suggests that this is not the case. Unlike the Old World species, the Virgin Islands *Khamisoides* species have flattened setae with forklike tines on their endites (figs. 480, 500, 544) resembling those found in the Neotropical genera *Stenoonops* and *Reductoonops*. The Virgin Islands species share other features with those of *Reductoonops*, including the presence of only two eyes and a reduced spinneret number (five in *Khamisoides*, where the two posterior median spinnerets have fused, four in *Reductoonops*, where they have been lost entirely). Of course, these reduction characters might be at least partially correlated with the small size of the animals (males of *Khamisoides* range from 1.2–1.4 mm in total length, only slightly larger than those of *Reductoonops*, which can be as small as 0.79 mm long).

If *Khamisoides* is more closely related to *Reductoonops* than to *Khamiscar*, the sternal extensions, loss of tarsal organ serial dimorphism, and reduction in raised tarsal organ receptor number must have occurred in parallel. On the other hand, if *Khamisoides* is more closely related to *Khamiscar* than to *Reductoonops*, the forklike endite setae, loss of the posterior eyes, and reduction in spinneret number are homoplasious. That would scarcely be surprising for the latter two characters, as there is certainly homoplasy in eye loss (because some members of *Reductoonops* retain six eyes), and fusion of the posterior median spinnerets need not be a necessary step in their loss.

If the first hypothesis is true, we would expect that *Khamiscar* species would lack the subdistal femoral constrictions, accompanied by a straight row of setae, that occur in *Reductoonops* (see Platnick and Berniker, 2014a: figs. 89, 90) as well as *Stenoonops* (see Platnick and Dupérré, 2010b: figs. 63, 375) and *Scaphioides* (see Platnick and Dupérré, 2012: figs. 289, 290), and that *Khamisoides* species would have those femoral features. Although there is sometimes a straight, subdistal setal row in *Khamiscar* (fig. 466), it does not seem to be followed by a distinct constriction (figs. 463–469). However, the Virgin Islands *Khamisoides* species also lack those femoral features (figs. 470–477).

Interestingly, though, the femora of *Khamisoides* species do have dorsal rows of pore plates (figs. 470–477). Members of the three Old World genera with sternal extensions lack femoral pore plates, but such plates do occur in *Reductoonops* (see Platnick and Berniker, 2014a: figs. 39, 89, 90) as well as *Longoonops* (see Platnick and Dupérré, 2010b: figs. 592, 593). *Khamisoides* species also have platelets on the carapace (figs. 493, 537), a feature shared (among these genera) only with *Reductoonops*, but such platelets are common in fully soft-bodied oonopids, and may well be plesiomorphic for the family.

One of the reviewers of our manuscript, Darrell Ubick, noted that in all four genera treated here, the tarsal claws are accompanied by setae with greatly elongated bases, especially on the anterior legs (see figs. 35, 88, 176, 322, 355, 517). This is not a character that has been well studied in any oonopid groups, but setae with similarly elongated bases are found near the claws in at least some species of *Stenoonops* (see Platnick and Dupérré, 2010b: fig. 376) and *Hortoonops* (see Platnick and Dupérré, 2012: fig. 341).

The bizarre genitalia found in female *Khamisoides* (figs. 536, 580, 600) present some similarities to those of *Khamisia* (cf. figs. 59, 100) but could just as easily be derived from genitalic structures like those found in some *Stenoonops* species (cf. Platnick et al., 2012b: figs. 3I–K). Hence we do not regard the available evidence as decisive. The sternal extensions may or may not be a synapomorphy uniting all the taxa treated below; the Virgin Islands *Khamisoides* may actually be more closely related to the widespread Neotropical genus *Reductoonops* than to the Old World genera *Khamisia*, *Khamisina*, and/or *Khamiscar*, despite their similarly modified sterna. However, to date *Khamisoides* and *Khamiscar* are the only oonopine genera in which both the typical tarsal organ serial dimorphism and the typical tarsal organ raised receptor numbers appear to have been reduced, and that may signify a true trans-Atlantic relationship.

Our methods follow those of Platnick and Dupérré (2009a); only differences from the males (beyond the obvious lack of male endite modifications) are mentioned in the descriptions of

females. Scans were taken from uncoated right male palps, and the images were flipped for consistency. All measurements are in mm; high-resolution versions of the presented images as well as many additional images, a sortable version of the geocoded locality data, and a distribution map for each species (with dots linked to the specimen data) will be available on the goblin spider Planetary Biodiversity Inventory (PBI) project's website (<http://research.amnh.org/oonopidae>). Users should note that the relatively small published images are merely avatars for the actual image files on the website, which can each be enlarged several times before pixelating.

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York, NY
BMNH	Natural History Museum, London, England
CAS	California Academy of Sciences, San Francisco, CA
FSCA	Florida State Collection of Arthropods, Gainesville, FL
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium
MZT	Museum of Zoology, Turku University, Turku, Finland
TAU	Tel Aviv University, Tel Aviv, Israel
UU	Uppsala Universitet, Uppsala, Sweden

Khamisia Saaristo and van Harten

Khamisia Saaristo and van Harten, 2006: 135 (type species by original designation *K. banisad* Saaristo and van Harten).

DIAGNOSIS: The combined presence of large lateral extensions of the sternum that widely separate coxae II and III (figs. 7, 50, 55) and only two trichobothria on the palpal tibia (figs. 13, 71) separates members of this genus from all other known oonopids. Males have a distinctively short, wide embolus with deep basal ridges and a tiny, prolaterally directed prong (figs. 20, 111, 135); females have tripartite anterior genitalia, with one median and two lateral projections (figs. 59, 100, 123).

DESCRIPTION: Total length of males 0.9–1.3, of females 1.0–1.6. Cephalothorax and appendages yellow, without pattern, abdomen white except for pale yellow ventral scuta, without pattern. **Cephalothorax:** Carapace elongated hexagonal in dorsal view (figs. 1, 60), pars cephalica flat in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, anterolateral corners with slightly sclerotized triangular projections, pars thoracica with rounded posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth, sides finely reticulate (figs. 3, 62), fovea absent, lateral margin straight, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal, nonmarginal pars cephalica, pars thoracica setae dark, needlelike, scattered. Clypeus margin slightly rebordered (figs. 2, 61), clypeus straight in front view, sloping forward in lateral view, low, ALE separated from edge of carapace by less than their radius, median projection absent; setae dark, needlelike. Chilum absent. Eyes six, well developed, ALE largest, oval,

PME squared, PLE oval; posterior eye row recurved from above, procurved from front (fig. 4); ALE separated by roughly their radius, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum longer than wide, not fused to carapace, median concavity absent, without radial furrows between coxae I-II, II-III, III-IV, radial furrow opposite coxae III absent, surface smooth, without pits, microsculpture absent, sickle-shaped structures absent, anterior margin with continuous transverse groove, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae II and III much greater than distance between coxae I and II or coxae III and IV (figs. 7, 50, 55, 63), extensions of precoxal triangles absent, lateral margins with rounded extensions between coxae, without posterior hump; setae sparse, dark, needlelike, evenly scattered, originating from surface; hair tufts absent. Chelicerae straight, anterior face unmodified (figs. 5, 64); without teeth on promargin or retromargin; fangs without toothlike projections, directed medially, elongated, without prominent basal process, tip with elongated venom gland opening (figs. 6, 65), setae dark, needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed (fig. 5), posterior surface unmodified, promargin with row of flattened setae, inner margin unmodified, laminate groove absent. Labium triangular, fused to sternum (figs. 8, 66), anterior margin indented at middle (figs. 11, 69), same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally not excavated (fig. 51), same as sternum in sclerotization, serrula absent in males (fig. 9), present in females as single row of teeth (figs. 67, 68), anteromedian tip of males with or without single strong, toothlike projection (figs. 10, 103, 141), flattened setae on tip without forklike tines, posteromedian part unmodified. Labrum with flattened, triangular basal projection (figs. 12, 70). Female palp without claw or spines (figs. 72, 73); patella without prolateral row of ridges; tibia with only two trichobothria (fig. 71), tarsus unmodified. **Abdomen:** Cylindrical, without long posterior extension, but females often with contents shrunk, leaving empty space under cuticle (fig. 56), rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent posteriorly. Book lung covers large, ovoid, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove (figs. 22, 74). Pedicel tube short, unmodified, scutopedicel region unmodified, scutum not extending far dorsal of pedicel, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum absent. Epigastric scutum weakly sclerotized, not surrounding pedicel, not protruding, small lateral sclerites absent, scutum of females without lateral joints. Postepigastric scutum weakly sclerotized, short, only around epigastric furrow, not fused to epigastric scutum (fig. 57), anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum absent. Supraanal scutum absent. Abdominal setae dark, needlelike, epigastric area setae not basally thickened. Dense patch of setae anterior to spinnerets absent. Colulus present. Six spinnerets, anterior laterals bisegmented, basal segment apparently without oblique membranous strip (figs. 23, 77), posterior medians unisegmented, posterior laterals bisegmented (figs. 24, 78), spigots scanned only in *K. hayer*, anterior laterals with one major ampullate gland spigot and at least one piriform gland spigot (figs. 25, 79), posterior medians with one spigot (figs. 26, 80), posterior laterals with one spigot (figs. 27, 81). **Legs:** Femora without subdistal constriction or subdistal transverse row of setae (figs. 28, 29,

82, 83); femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex, ventral scopula both absent, metatarsi I, II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent. Leg spines absent. Tarsi I to IV without inferior claw. Superior claws with outer row of three or four large, blunt-tipped teeth, inner row with distal series of closely spaced, narrow teeth (figs. 31–38, 84–91). Tarsal organs variable (figs. 39–49, 92–96; see Introduction). Trichobothrial base with rectangular opening (fig. 30). **Genitalia:** Male epigastric region with sperm pore not visible; furrow without Ω -shaped insertions, without setae. Male palp normal size, not strongly sclerotized, right and left palps mirror images; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with only two trichobothria (fig. 13); cymbium ovoid in dorsal view, completely fused with bulb, no seam visible (figs. 15–17), not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent (fig. 14); bulb 1–1.5 times as long as cymbium, stout, spherical; embolus light (figs. 52–54), without prolateral excavation, short, wide, with deep basal ridges and tiny, prolaterally directed prong (figs. 18–21). Females with tripartite anterior genitalia consisting of one median and two lateral projections (figs. 58, 59, 75), each projection with distal glands (figs. 75, 76).

DISTRIBUTION: Middle East south to Kenya.

Key to Species of *Khamisia*

- 1. Males (unknown in *banisad*) 2
 - Females (unknown in *holmi*) 4
- 2. Fangs with heavily sclerotized, excavated tip (figs. 138, 143) *holmi*
 - Fangs without such modifications (figs. 6, 51) 3
- 3. Embolus relatively short (figs. 20, 53) *hayer*
 - Embolus longer (figs. 105, 111) *atlit*
- 4. Lateral genitalic processes long, narrow (fig. 123) *atlit*
 - Lateral genitalic processes with recurved, rounded tip (figs. 59, 100) 5
- 5. Median genitalic process relatively long (fig. 100) *banisad*
 - Median genitalic process relatively short (fig. 59) *hayer*

Khamisia hayer, new species

Figures 1–96

TYPES: Male holotype, female allotype, four male paratypes, and four female paratypes taken from leaf litter near al-Hayer, 24°33'N, 55°45'E, United Arab Emirates (Mar. 28, 2005; A. van Harten), deposited in MZT (PBI_OON 51503).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *K. atlit* but have a shorter embolus that is ridged throughout most of its length (fig. 20); females resemble those of *K. banisad* but have a shorter median genitalic process (fig. 59).

MALE (PBI_OON 51503, figs. 1–54): Total length 1.21. ALE separated by their radius to diameter. Tip of endites claw shaped. Embolus short, wide, with ventral projection originating at about two-thirds of length.

FEMALE (PBI_OON 51503, figs. 55–96): Total length 1.35. Anterior genitalic process distally widened, lateral processes with recurved, rounded tips that may serve as spermathecae.

OTHER MATERIAL EXAMINED: UNITED ARAB EMIRATES: **Abu Dhabi**: Al-Hayer, 24°33' N, 55°45' E, Jan. 15, 2005, leaf litter (A. van Harten, MZT PBI_OON 51504), 4♂, 6♀. CAPE VERDE: **Ile São Vicente**: Mindelo, Nov. 11, 1998, tree trunk litter (W. Tavernier, MRAC 220041, PBI_OON 29130), 1♂.

DISTRIBUTION: United Arab Emirates; apparently introduced into Cape Verde (see <http://research.amnh.org/oonopidae> for numerous images of the male from there).

Khamisia banisad Saaristo and van Harten

Figures 97–100

Khamisia banisad Saaristo and van Harten, 2006: 136, figs. 18–21 (female holotype from Khamis Bani Sa'ad, Yemen, in MZT; examined).

DIAGNOSIS: Females resemble those of *K. hayer* but have a longer median genitalic process (fig. 100).

MALE: Unknown.

FEMALE (PBI_OON 9870, figs. 97–100): Total length 1.53. Anterior genitalic process long, distally widened, lateral processes with recurved, rounded tips that may serve as spermathecae.

MATERIAL EXAMINED: YEMEN: **Al Mahwit**: Khamis Bani Sa'ad, June 23, 1999, leaf litter in and around banana plantation (A. van Harten, MZT 3066, PBI_OON 9870), 1♀ (holotype).

DISTRIBUTION: Yemen.

Khamisia atlit, new species

Figures 101–124

TYPES: Male holotype and male paratype from Atlit, Haifa, Israel (Sept. 18–23, 2005; M. Vonshak), deposited in TAU (PBI_OON 51500).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

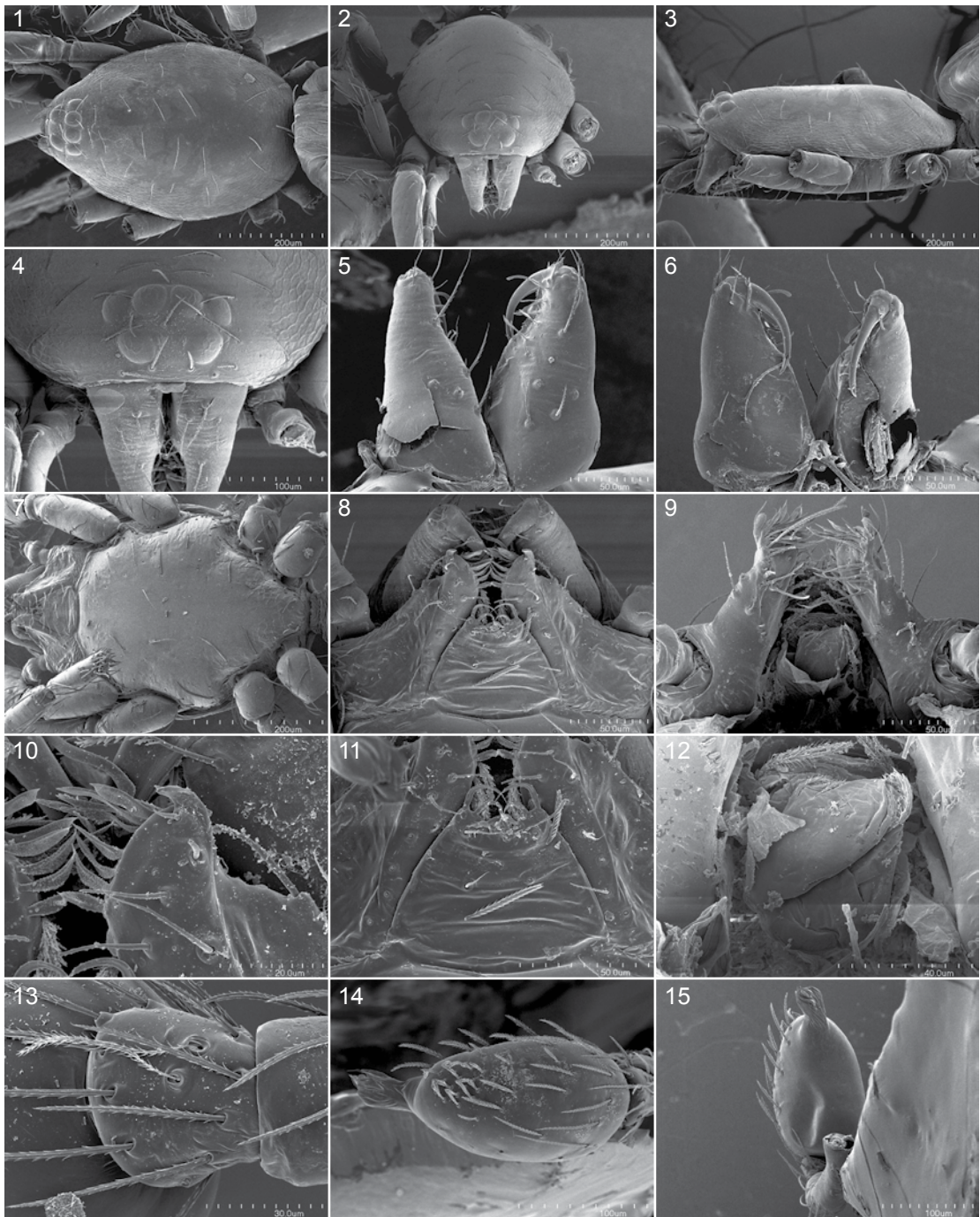
DIAGNOSIS: Males resemble those of *K. hayer* but have a longer embolus with a smooth median portion (fig. 111); females differ from those of *K. hayer* and *K. banisad* in having narrow lateral genitalic processes without rounded tips (fig. 123).

MALE (PBI_OON 51500, figs. 101–116): Total length 0.95. ALE separated by less than their radius. Tip of endite rounded, with single, blunt-tipped seta. Embolus relatively long, straight.

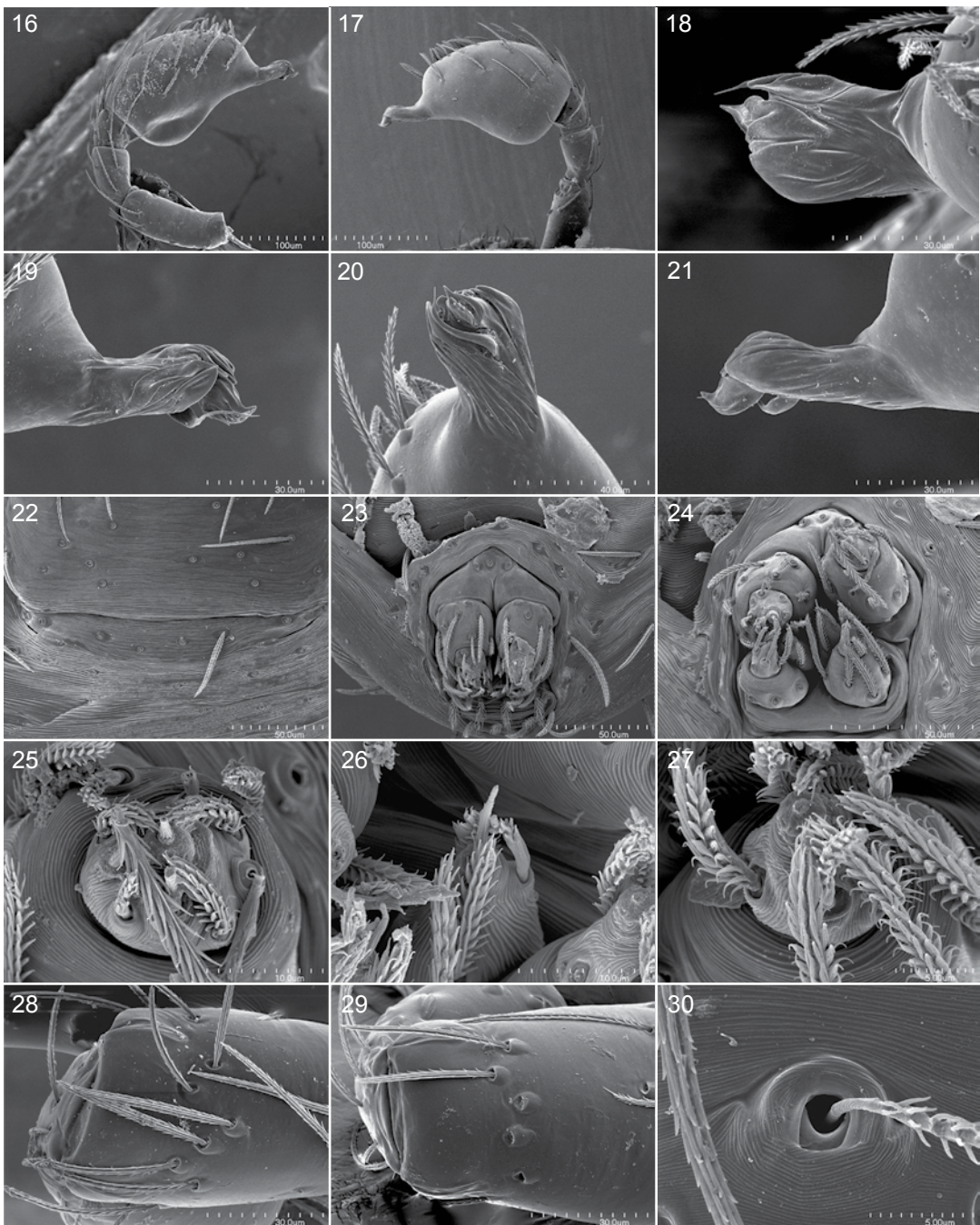
FEMALE (PBI_OON 51501, figs. 117–124): Total length 1.07. Median genitalic process slightly expanded at tip, lateral processes narrow throughout their length.

OTHER MATERIAL EXAMINED: ISRAEL: **Central**: Gedera, Oct. 20–25, 2005 (M. Vonshak, TAU PBI_OON 51501), 2♀. **Tel Aviv**: Tel Aviv, Oct. 17–22, 2005 (M. Vonshak, TAU PBI_OON 51502), 2♂, 1♀.

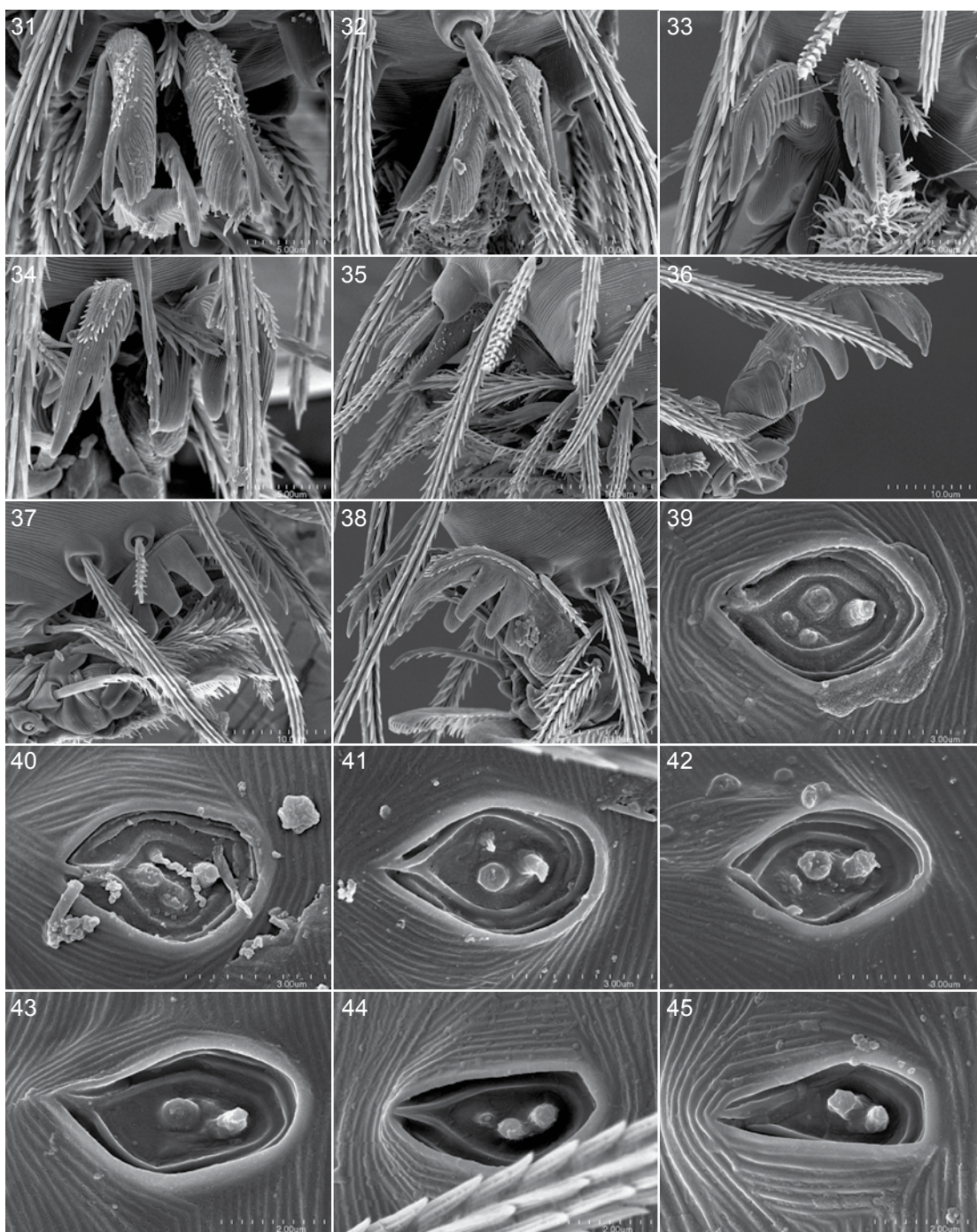
DISTRIBUTION: Israel.



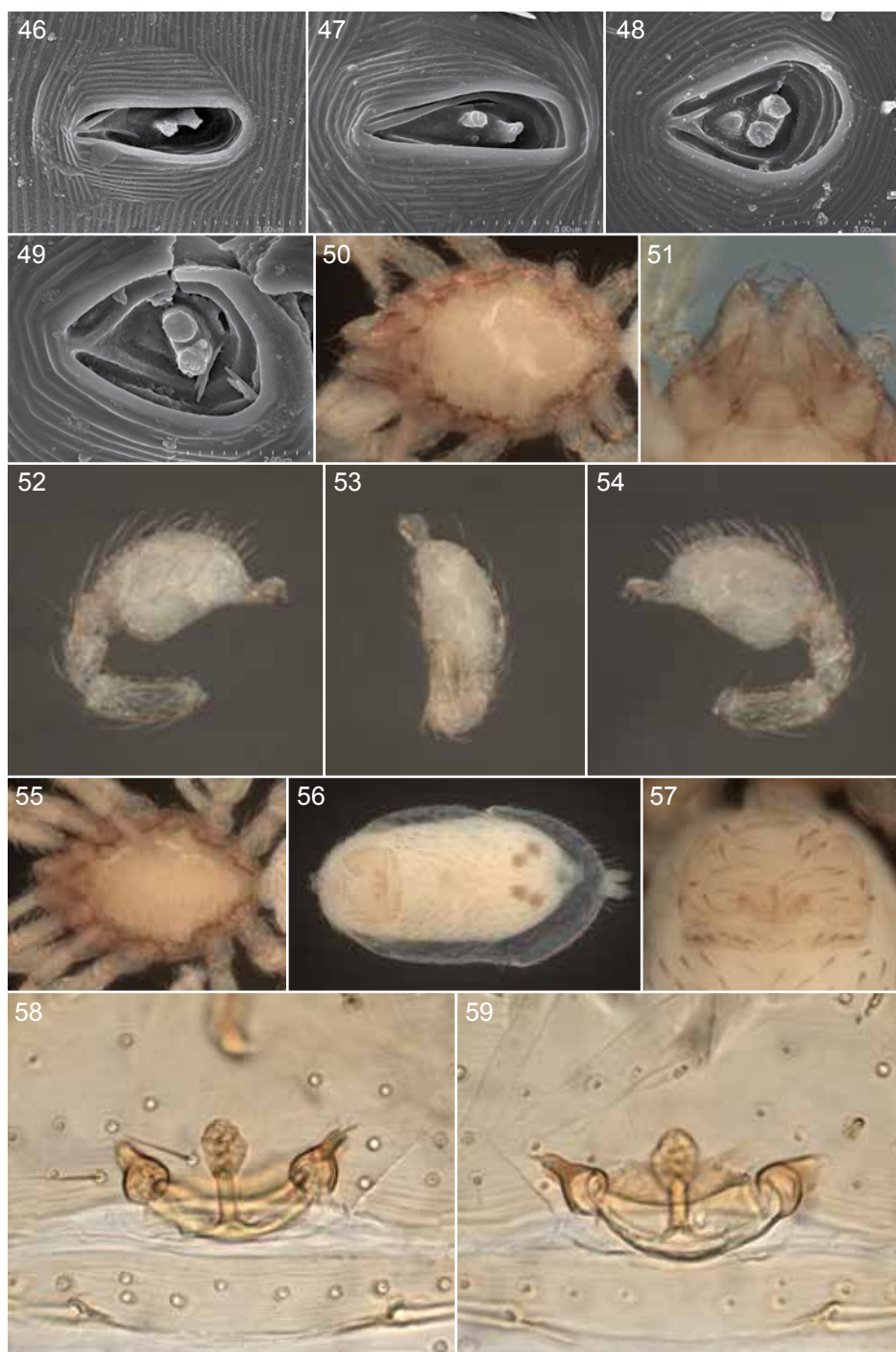
FIGURES 1–15. *Khamisia hayer*, new species, male. 1. Carapace, dorsal view. 2. Same, anterior view. 3. Same, lateral view. 4. Eye group, anterior view. 5. Chelicerae, same. 6. Same, posterior view. 7. Sternum, ventral view. 8. Mouthparts, same. 9. Endites, dorsal view. 10. Tip of endites, ventral view. 11. Labium, same. 12. Labrum, dorsal view. 13. Palpal tibia, same. 14. Left palp, same. 15. Same, ventral view.



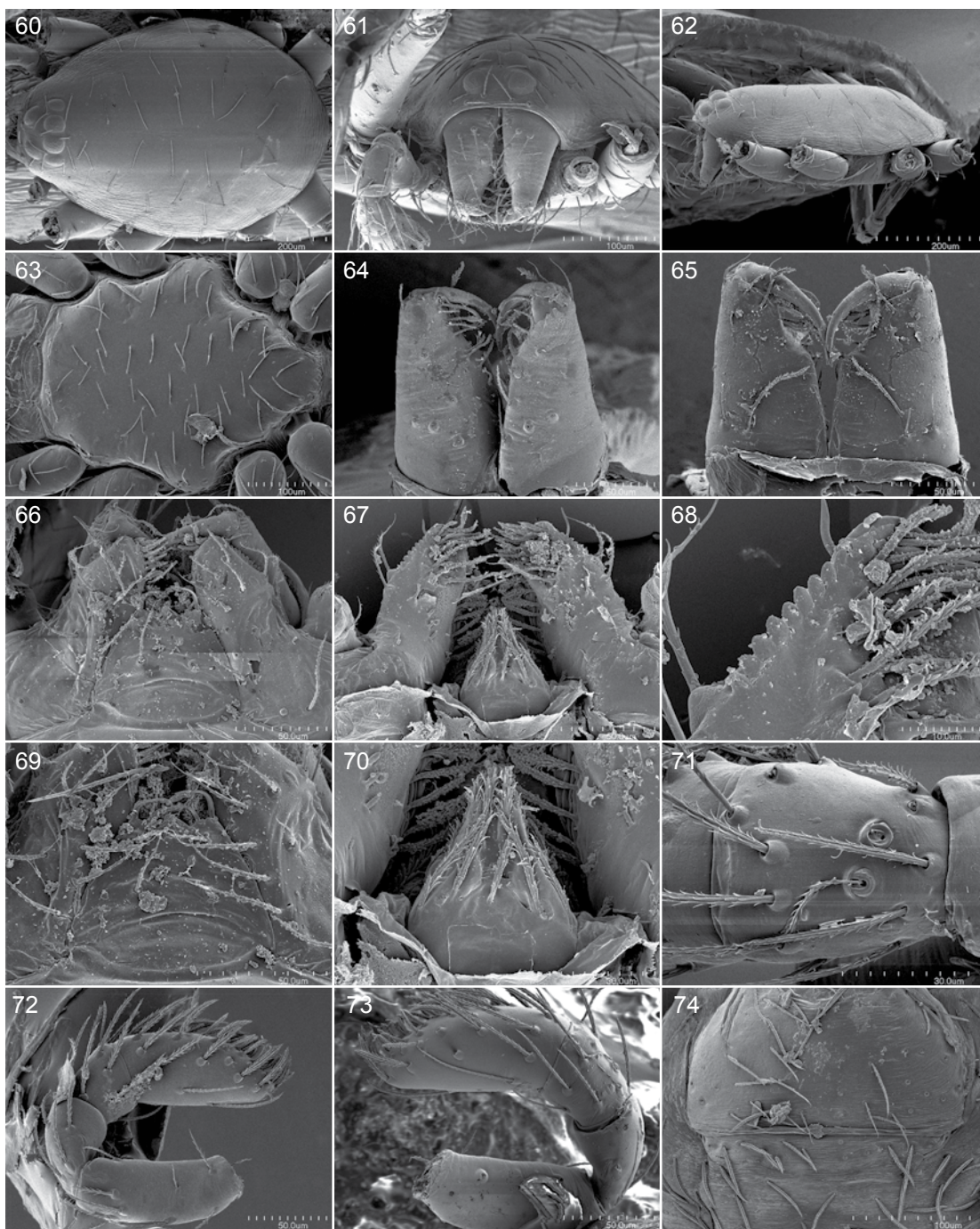
FIGURES 16–30. *Khamisia hayer*, new species, male. 16. Left palp, prolateral view. 17. Same, retrolateral view. 18. Left embolus, dorsal view. 19. Same, prolateral view. 20. Same, ventral view. 21. Same, retrolateral view. 22. Epigastric region, ventral view. 23. Spinnerets, same. 24. Same, distal view. 25. Anterior lateral spinneret, same. 26. Posterior median spinneret, same. 27. Posterior lateral spinneret, same. 28. Tip of femur I, dorsal view. 29. Same, femur III. 30. Trichobothrial base from metatarsus II, same.



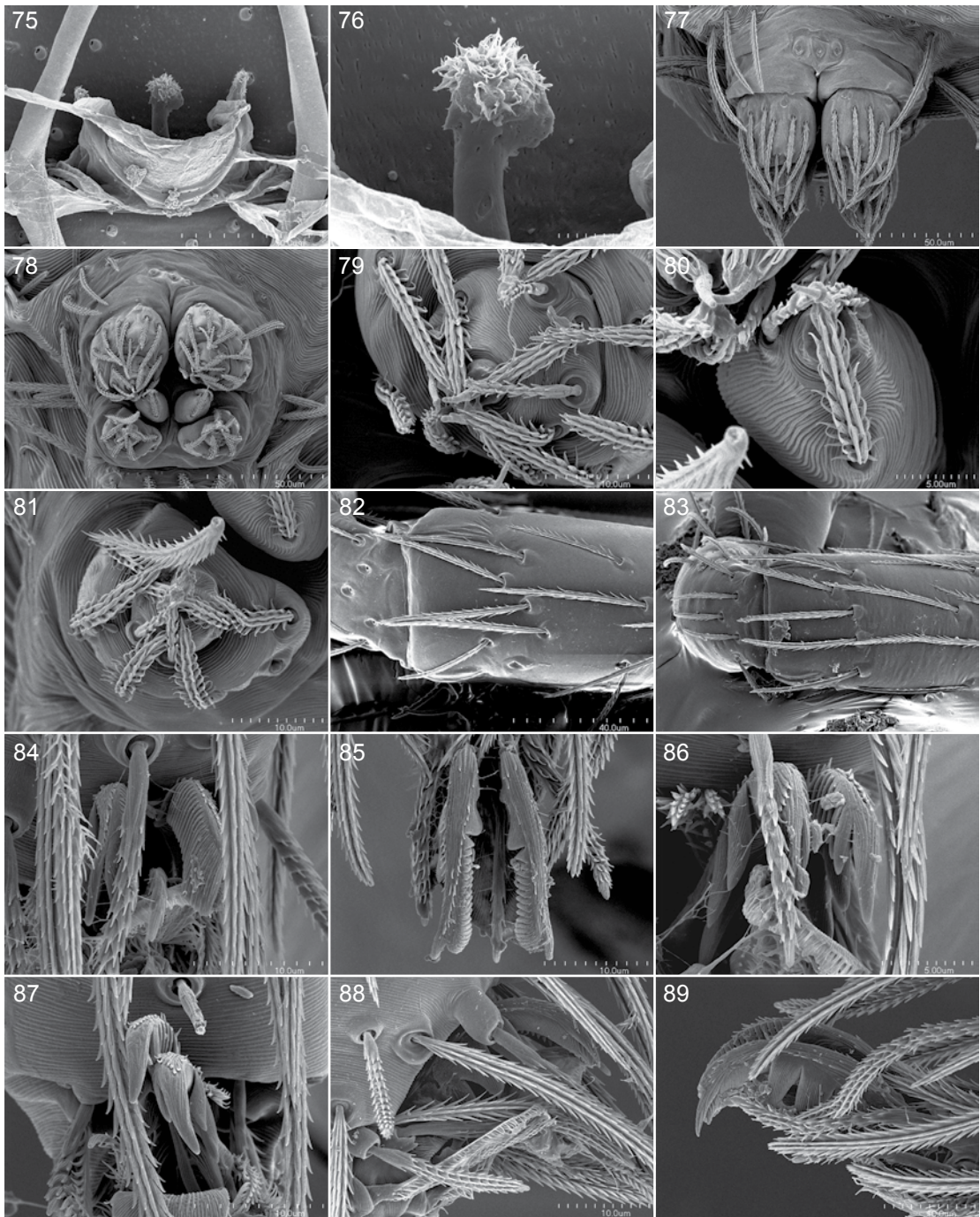
FIGURES 31–45. *Khamisia hayer*, new species, male (41, 43, 45 from PBI_OON 51504, all others from 51503). 31. Claws of leg I, distal view. 32. Same, leg II. 33. Same, leg III. 34. Same, leg IV. 35. Claws of leg I, lateral view. 36. Same, leg II. 37. Same, leg III. 38. Same, leg IV. 39–41. Tarsal organ of leg I, dorsal view. 42, 43. Same, leg II. 44, 45. Same, leg III.



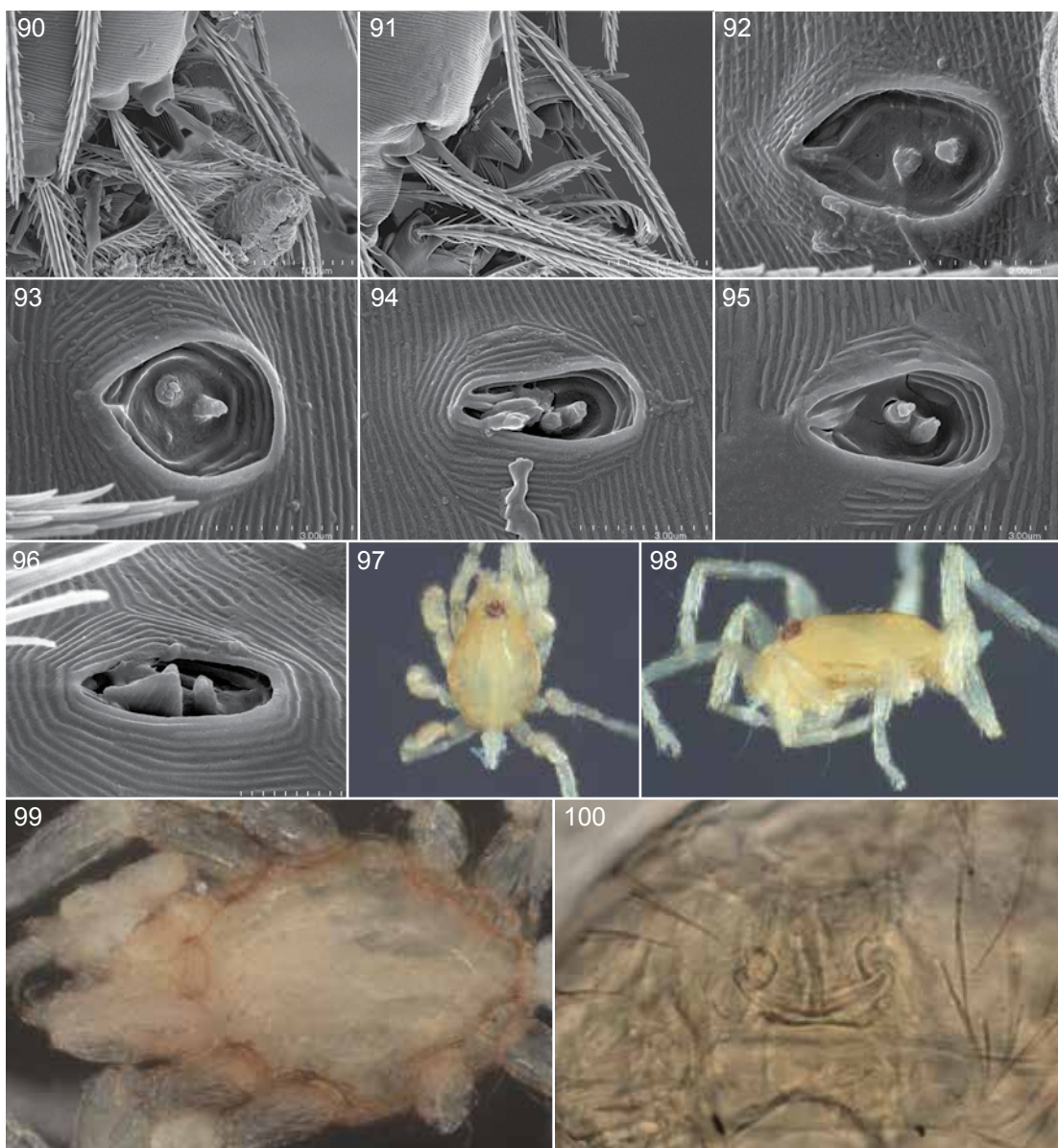
FIGURES 46–59. *Khamisia hayer*, new species, male (46–54) and female (55–59). **46, 47.** Tarsal organ from leg IV, dorsal view, 51503 and 51504. **48, 49.** Same, palp. **50, 55.** Sternum, ventral view. **51.** Mouthparts, same. **52.** Left palp, prolateral view. **53.** Same, ventral view. **54.** Same, retrolateral view. **56.** Abdomen, ventral view. **57, 58.** Genitalia, ventral view. **59.** Same, dorsal view.



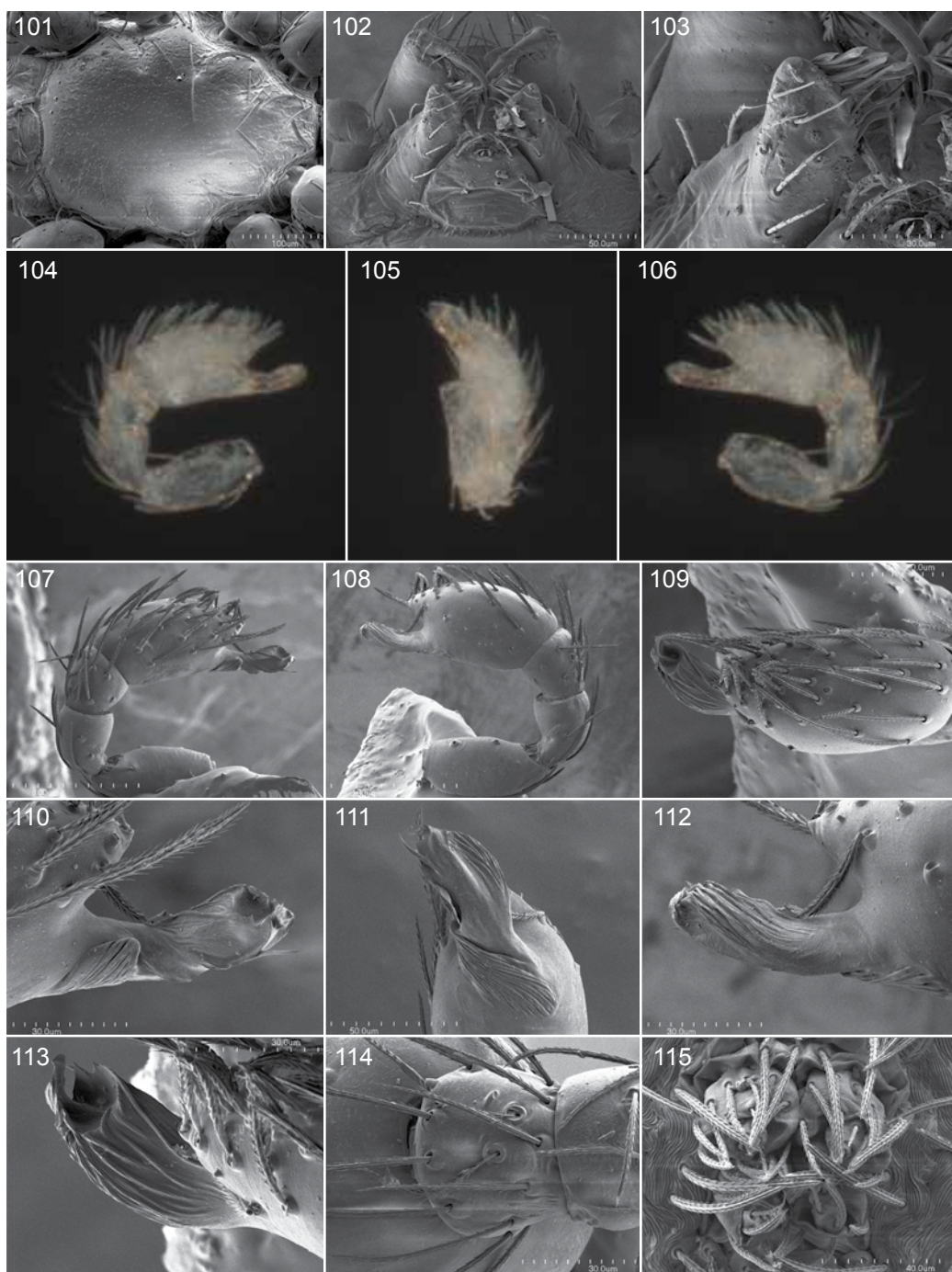
FIGURES 60–74. *Khamisia hayer*, new species, female. **60.** Carapace, dorsal view. **61.** Same, anterior view. **62.** Same, lateral view. **63.** Sternum, ventral view. **64.** Chelicerae, anterior view. **65.** Same, posterior view. **66.** Mouthparts, ventral view. **67.** Endites, dorsal view. **68.** Serrula, same. **69.** Labium, ventral view. **70.** Labrum, dorsal view. **71.** Palpal tibia, same. **72.** Palp, prolateral view. **73.** Same, retrolateral view. **74.** Epigastric area, ventral view.



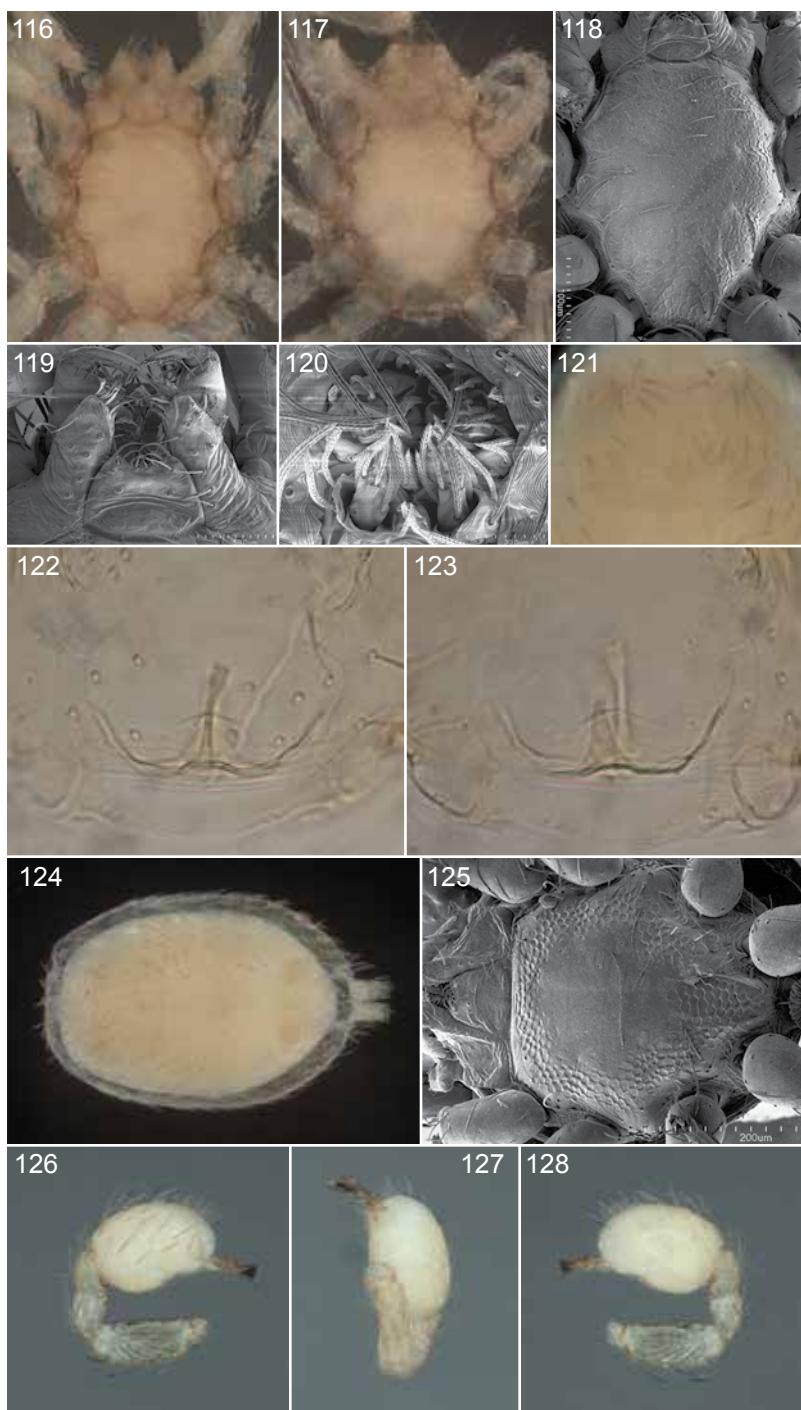
FIGURES 75–89. *Khamisia hayes*, new species, female. 75. Internal genitalia, dorsal view. 76. Anterior genitalic process, same. 77. Spinnerets, ventral view. 78. Same, distal view. 79. Anterior lateral spinneret, same. 80. Posterior median spinneret, same. 81. Posterior lateral spinneret, same. 82. Tip of femur I, dorsal view. 83. Same, femur III. 84. Claws of leg I, distal view. 85. Same, leg II. 86. Same, leg III. 87. Same, leg IV. 88. Claws of leg I, lateral view. 89. Same, leg II.



FIGURES 90–100. 90–96. *Khamisia hayer*, new species, female. 97–100. *K. banisad* Saaristo and van Harten, female. **90.** Claws of leg III, lateral view. **91.** Same, leg IV. **92.** Tarsal organ of leg I, dorsal view. **93.** Same, leg II. **94.** Same, leg III. **95.** Same, leg IV. **96.** Same, palp. **97.** Carapace, same. **98.** Same, lateral view. **99.** Sternum, ventral view. **100.** Internal genitalia, ventral view. (97, 98 courtesy of Wouter Fannes.)



FIGURES 101–115. *Khamisia atlit*, new species, male. **101.** Sternum, ventral view. **102.** Endites, same. **103.** Tip of endite, same. **104, 107.** Left palp, prolateral view. **105.** Same, ventral view. **106, 108.** Same, retrolateral view. **109.** Same, dorsal view. **110.** Left embolus, prolateral view. **111.** Same, ventral view. **112.** Same, retro-lateral view. **113.** Same, dorsal view. **114.** Palpal tibia, dorsal view. **115.** Spinnerets, distal view.



FIGURES 116–128. 116–124. *Khamisia atlit*, new species, male (116) and female (117–124). 125–128. *K. holmi*, new species, male. 116–118, 125. Sternum, ventral view. 119. Endites, same. 120. Spinnerets, distal view. 121, 122. Genitalia, ventral view. 123. Same, dorsal view. 124. Abdomen, ventral view. 126. Left palp, prolateral view. 127. Same, ventral view. 128. Same, retrolateral view.

Khamisia holmi, new species

Figures 125–143

TYPE: Male holotype taken from litter in a ravine forest situated at an elevation of 600 m at a public campsite in Meru National Park, Isiolo, Kenya (Dec. 26, 1975; Å. Holm), deposited in UU (332, PBI_OON 8532).

ETYMOLOGY: The specific name is a patronym in honor of the collector of the holotype, the late Swedish arachnologist, Åke Holm.

DIAGNOSIS: Males can easily be recognized by their heavily sclerotized, distally excavated cheliceral fangs (figs. 138, 143).

MALE (PBI_OON 8532, figs. 125–143): Total length 1.09. ALE separated by less than their radius. Tip of endites with rounded protrusion bearing single, blunt-tipped seta. Embolus long, narrow, with ventral projection originating at about half its length.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Central Kenya.

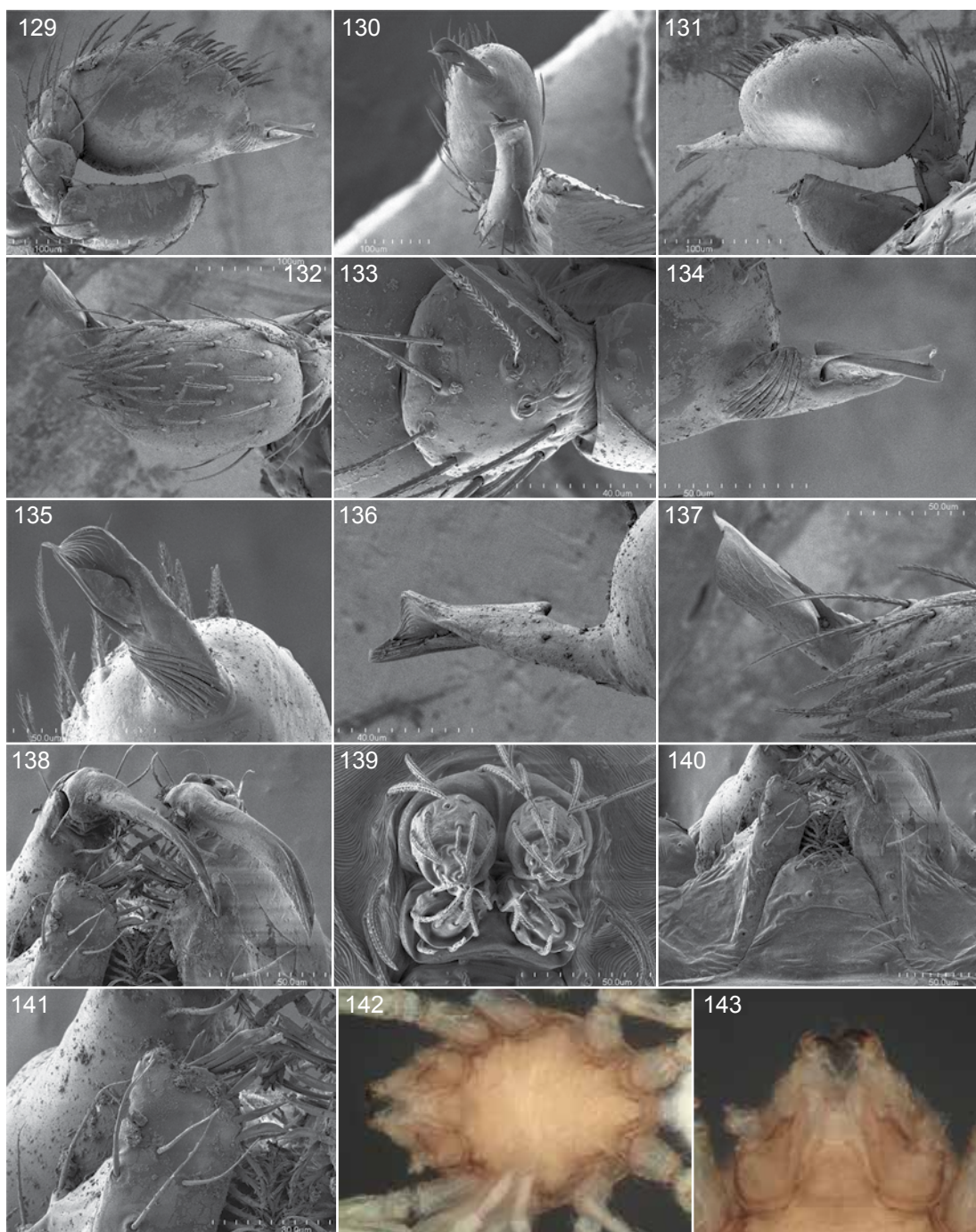
Khamisina, new genus

TYPE SPECIES: *Khamisina kivu*, new species.

ETYMOLOGY: The generic name refers to the similarities to *Khamisia*, and is feminine in gender.

DIAGNOSIS: The bottlebrush-shaped setae on the cheliceral promargin (figs. 147, 204, 261) are diagnostic. These species differ from others with similarly enlarged sternal extensions in having a patterned abdomen (figs. 191, 251, 276) and a punctate sternum (figs. 149, 206, 236, 263, 280). The posterior median eyes resemble those of *Longoonops* in being relatively long and narrow (figs. 189, 249, 255, 276).

DESCRIPTION: Total length of males 1.1–1.3, of females 1.2–1.4. Cephalothorax and appendages yellow, without pattern, abdomen white except for pale yellow ventral scuta, with pattern (fig. 191). **Cephalothorax:** Carapace elongated hexagonal in dorsal view (figs. 144, 201), pars cephalica flat in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, anterolateral corners with slightly sclerotized triangular projections, pars thoracica with rounded posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes, surface of elevated portion of pars cephalica punctate, sides punctate (figs. 146, 203), fovea absent, lateral margin straight, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal, nonmarginal pars cephalica, pars thoracica setae dark, needlelike, scattered. Clypeus margin slightly rebordered (figs. 145, 202), straight in front view, sloping forward in lateral view, high, ALE separated from edge of carapace by more than their radius, slight median projection present; setae dark, needlelike. Chilum undivided. Eyes six, well developed, ALE largest, oval, PME relatively long, narrow (fig. 189), PLE oval; posterior eye row recurved from above, procurved from front; ALE separated by less than their radius, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME



FIGURES 129–143. *Khamisia holmi*, new species, male. **129.** Left palp, prolateral view. **130.** Same, ventral view. **131.** Same, retrolateral view. **132.** Same, dorsal view. **133.** Palpal tibia, same. **134.** Left embolus, prolateral view. **135.** Same, ventral view. **136.** Same, retrolateral view. **137.** Same, dorsal view. **138.** Fang, anterior view. **139.** Spinnerets, distal view. **140.** Endites, ventral view. **141.** Tip of endite, same. **142.** Sternum, same. **143.** Mouthparts, same.

separated by less than PME radius. Sternum longer than wide, not fused to carapace, median concavity absent, with radial furrows between coxae I-II, II-III, III-IV, furrows smooth, radial furrow opposite coxae III absent, surface finely punctate (figs. 149, 206), without pits, microsculpture everywhere but middle, sickle-shaped structures absent, anterior margin with continuous transverse groove, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae II and III greater than distance between coxae I and II or coxae III and IV (figs. 190, 196), extensions of precoxal triangles absent, lateral margins with rounded extensions between coxae, without posterior hump; setae sparse, dark, needlelike, evenly scattered, originating from surface; hair tufts absent. Chelicerae straight, anterior face unmodified; without teeth on promargin or retromargin; fangs without toothlike projections, directed medially, elongated, without prominent basal process, tip with elongated venom gland opening (figs. 148, 205, 262); setae dark, needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed, posterior surface unmodified, promargin with row of bottlebrush-shaped setae (figs. 147, 204, 234), inner margin unmodified, laminate groove absent. Labium triangular, fused to sternum (figs. 150, 207), anterior margin indented at middle (figs. 154, 209), same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally not excavated, same as sternum in sclerotization, serrula absent in males, present in females as single row of teeth (fig. 208), males with anteromedian tip elongated (figs. 195, 237, 264), posteromedian part of males sometimes with dorsally originating horn (figs. 150–153), flattened setae on tip serrated but without forklike tines. Labrum with flattened, triangular subdistal projection (figs. 155, 210). Female palp without claw or spines (figs. 211, 212) but with terminal nubbin presumably representing remnant of claw (figs. 285, 286); patella without prolateral row of ridges; tibia with three trichobothria, distalmost one situated near distal margin (figs. 213, 287); tarsus unmodified. **Abdomen:** Cylindrical, without long posterior extension, but females often with contents shrunken, leaving empty space under cuticle (fig. 255), rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent posteriorly. Book lung covers large, ovoid, heavily sclerotized (fig. 198), without setae, anterolateral edge unmodified. Posterior spiracles connected by groove (figs. 165, 214). Pedicel tube short, unmodified, scutopedicel region unmodified, scutum not extending far dorsal of pedicel, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum absent. Epigastric scutum weakly sclerotized, not surrounding pedicel, not protruding, small lateral sclerites absent, scuta of females without lateral joints. Postepigastric scutum weakly sclerotized, short, only around epigastric furrow (fig. 197), not fused to epigastric scutum, anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum absent. Supraanal scutum absent. Abdominal setae dark, needlelike, epigastric area setae not basally thickened. Dense patch of setae anterior to spinnerets absent. Colulus present. Six spinnerets, anterior laterals bisegmented, basal segment with oblique membranous strip (figs. 166, 216), posterior medians unisegmented, posterior laterals bisegmented (figs. 167, 217), spigots scanned only in *K. kivu*, anterior laterals with one major ampullate gland spigot and two piriform gland spigots (figs. 168, 218), posterior medians with one spigot (figs. 169, 219), posterior laterals with two spigots (fig. 170, 220). **Legs:** Femora without subdistal constrict-

tion or subdistal transverse row of setae (figs. 171–174); femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex, ventral scopula both absent, metatarsi I, II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent. Leg spines absent. Tarsi I to IV without inferior claw. Superior claws of legs I–III with outer row of three or four large, blunt-tipped teeth (figs. 180–182, 225–227), inner row with distal series of closely spaced teeth (figs. 176–178, 221–223), those of leg IV apparently without inner tooth row, with only median row of short, proximally situated teeth (figs. 179, 183, 224, 228). Tarsal organs with two long, raised receptors, distal receptor bifid, pore receptor possibly present on anterior legs (figs. 184–188, 229–233). Trichobothrial base with distinct distal portion marked by ridges running perpendicular to other cuticular ridges (fig. 175). **Genitalia:** Male epigastric region with sperm pore not visible; furrow without Ω -shaped insertions, without setae. Male palp normal size, not strongly sclerotized, right and left palps mirror images; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria, distalmost one situated near distal margin (figs. 156, 241, 268); cymbium ovoid in dorsal view, completely fused with bulb, no seam visible (figs. 157–160), not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent; bulb 1–1.5 times as long as cymbium, stout, spherical; embolus light, without prolateral excavation, wide, tubelike (figs. 192–194), with subdistal prong (figs. 161–164). Females with two internesting V-shaped sclerites (figs. 199, 200), anterior sclerite with posteriorly directed glands (fig. 215).

DISTRIBUTION: Tropical Africa (Nigeria to Kenya).

Key to Species of *Khamisina*

1. Males. 2
 - Females (unknown in *kilifi*) 4
2. Endites with prominent lateral horns (figs. 150–153) *kivu*
 - Endites without such horns 3
3. Abdomen with just a few chevrons (fig. 249); tip of embolus rounded (fig. 247); Kenya *kilifi*
 - Abdomen with extensive pattern (fig. 255); tip of embolus with dorsal hook (fig. 274); Nigeria *ibadan*
4. Genital sclerites with narrow posterior margins (fig. 200) *kivu*
 - Genital sclerites with wide posterior margins (fig. 289) *ibadan*

Khamisina kivu, new species

Figures 144–233

Types: Male holotype and 12 male paratypes taken in litter at Bulemba, Ruindi plain, Nord-Kivu, D.R. Congo (June 14, 1972; M. Lejeune), deposited in MRAC (144682, PBI_OON 9425).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be recognized by the lateral horns on the endites (figs. 150–153), females by the narrow posterior margins of the internal genitalic sclerites (figs. 199, 200).

MALE (PBI_OON 9425, figs. 144–195): Total length 1.14. Dorsum of abdomen with five dark chevrons connected by dark marking along midline. Endites with lateral horns originating from dorsal surface. Embolus relatively short, wide.

FEMALE (PBI_OON 9165, figs. 196–233): Total length 1.32. Genitalia with V-shaped internal sclerites.

OTHER MATERIAL EXAMINED: D.R. CONGO: **Nord-Kivu**: Bulemba, Ruindi plain, June 14, 1972, litter (M. Lejeune, MRAC 223972, PBI_OON 9165), 3 ♀; Kabasha, Kaisola Valley, Ruindi plain, June 13, 1972, litter (M. Lejeune, MRAC 144557, 144560, PBI_OON 9417, 9463), 3 ♂.

DISTRIBUTION: D.R. Congo.

Khamisina kilifi, new species

Figures 234–254

TYPE: Male holotype taken in a garden at an elevation of 30 m at Kilifi, Kilifi, Kenya (Aug. 9, 1980; B. Fulton), deposited in AMNH (PBI_OON 36716) courtesy of John Murphy.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males have only a few dark chevrons on the abdominal dorsum (fig. 249) and a rounded embolar tip (fig. 247).

MALE (PBI_OON 36716, figs. 234–254): Total length 1.20. Dorsum of abdomen with few dark chevrons. Tip of endites with medially directed ridge. Embolus relatively short, with rounded tip.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: KENYA: **Kilifi**: Kilifi, Aug. 1980, litter, elev. 30 m (B. Fulton, AMNH PBI_OON 51505), 1 ♂, Aug. 1980, litter, beach, elev. 0 m (J., F. Murphy, AMNH PBI_OON 36719), 1 ♂.

DISTRIBUTION: Coastal Kenya.

Khamisina ibadan, new species

Figures 255–289

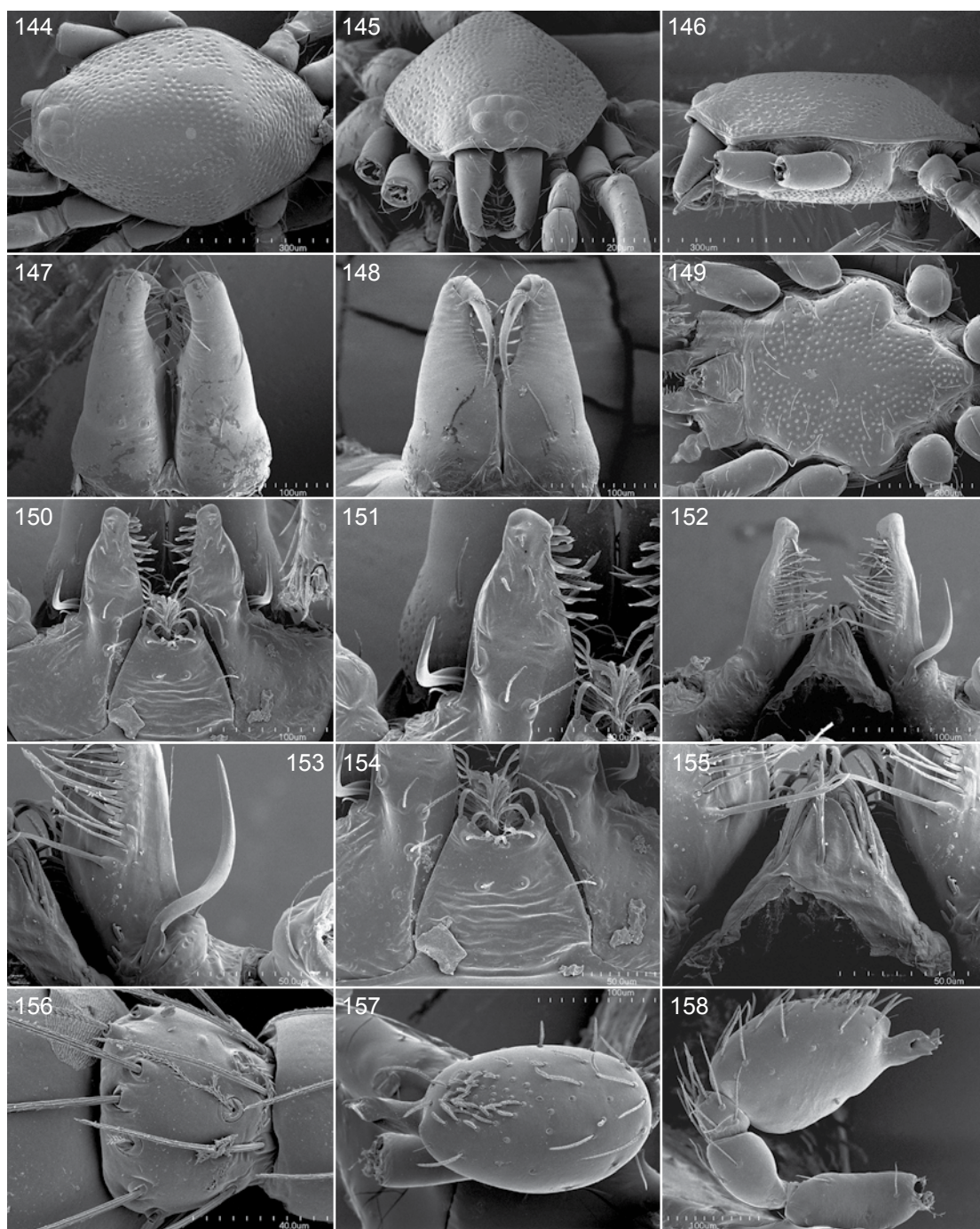
TYPES: Male holotype, female allotype, three male paratypes, and four female paratypes taken at the Centre for Overseas Pest Research site at the International Institute of Tropical Agriculture at Ibadan, Oyo, Nigeria (Dec. 27, 1973; A. Russell-Smith), deposited in BMNH (PBI_OON 51506).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males and females have a distinctive, elaborate pattern on the abdominal dorsum. Males can easily be recognized by the long, narrow tip of the endites (figs. 264–267), females by the broad posterior margins of the internal genitalic sclerites (figs. 288, 289).

MALE (PBI_OON 51506, figs. 255–275): Total length 1.21. Dorsum of abdomen with four dark chevrons connected by dark stripe along midline. Tip of endites extremely long, narrow. Embolus with expanded tip bearing dorsally directed hook.

FEMALE (PBI_OON 51506, figs. 276–289): Total length 1.25. Internal genitalic sclerites each with broad posterior margin.



FIGURES 144–158. *Khamisina kivu*, new species, male. **144.** Carapace, dorsal view. **145.** Same, anterior view. **146.** Same, lateral view. **147.** Chelicerae, anterior view. **148.** Same, posterior view. **149.** Sternum, ventral view. **150.** Labium and endites, same. **151.** Tip of endites, same. **152.** Endites, dorsal view. **153.** Base of endites, same. **154.** Labium, ventral view. **155.** Labrum, dorsal view. **156.** Palpal tibia, same. **157.** Left palp, same. **158.** Same, prolateral view.

OTHER MATERIAL EXAMINED: NIGERIA: **Oyo**: Centre for Overseas Pest Research site, International Institute of Tropical Agriculture, Ibadan, Nov. 1973, bush fallow (A. Russell-Smith, MRAC 160345, PBI_OON 9574), 1 ♂, Dec. 27, 1973 (A. Russell-Smith, MRAC 154609, 223954, PBI_OON 9113, 9641), 2 ♂, 1 ♀, Mar. 7, 1974, riverine woodland, W bank (A. Russell-Smith, MRAC 223945, PBI_OON 9363), 1 ♀.

DISTRIBUTION: Nigeria.

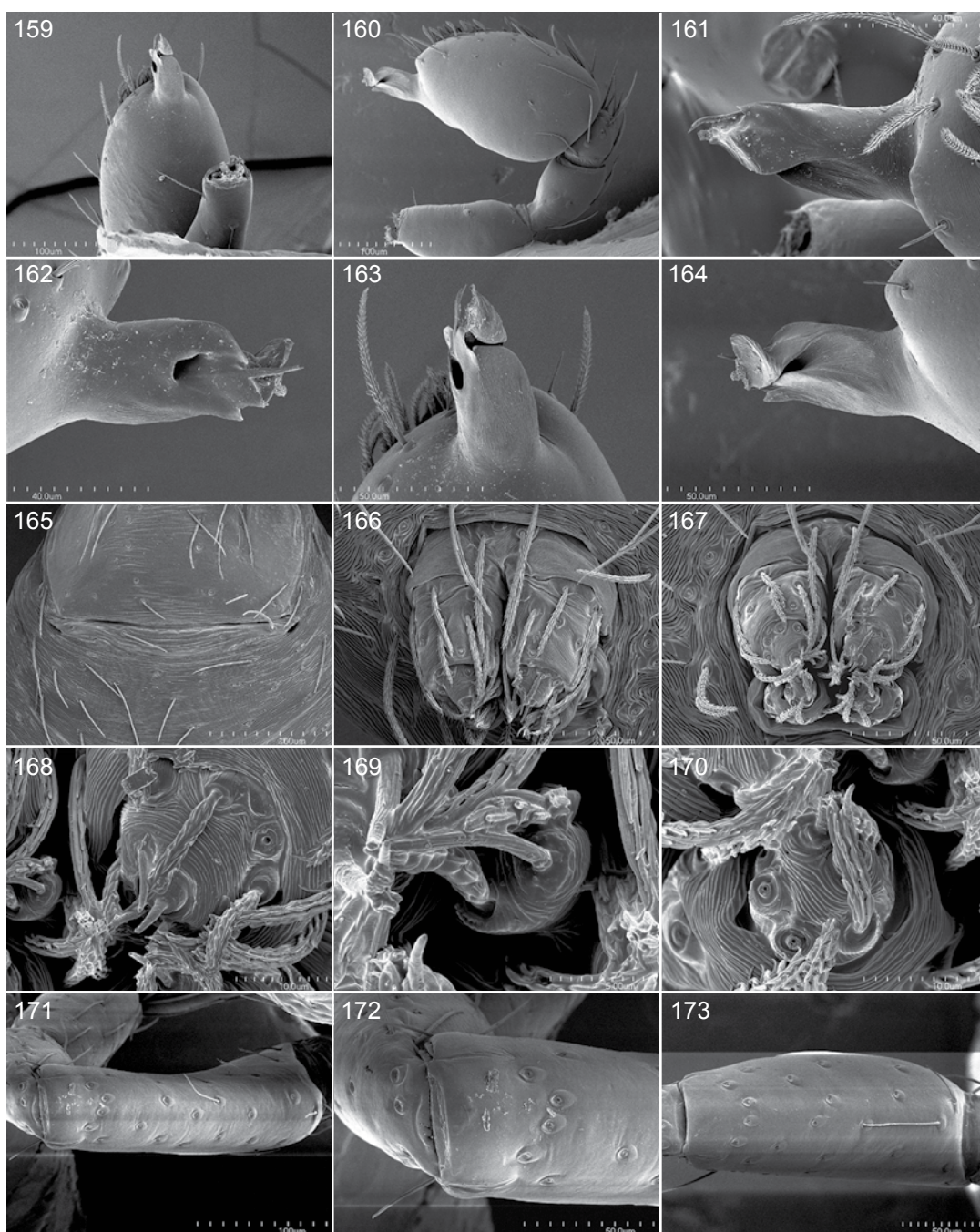
Khamiscar, new genus

TYPE SPECIES: *Khamiscar anta*, new species.

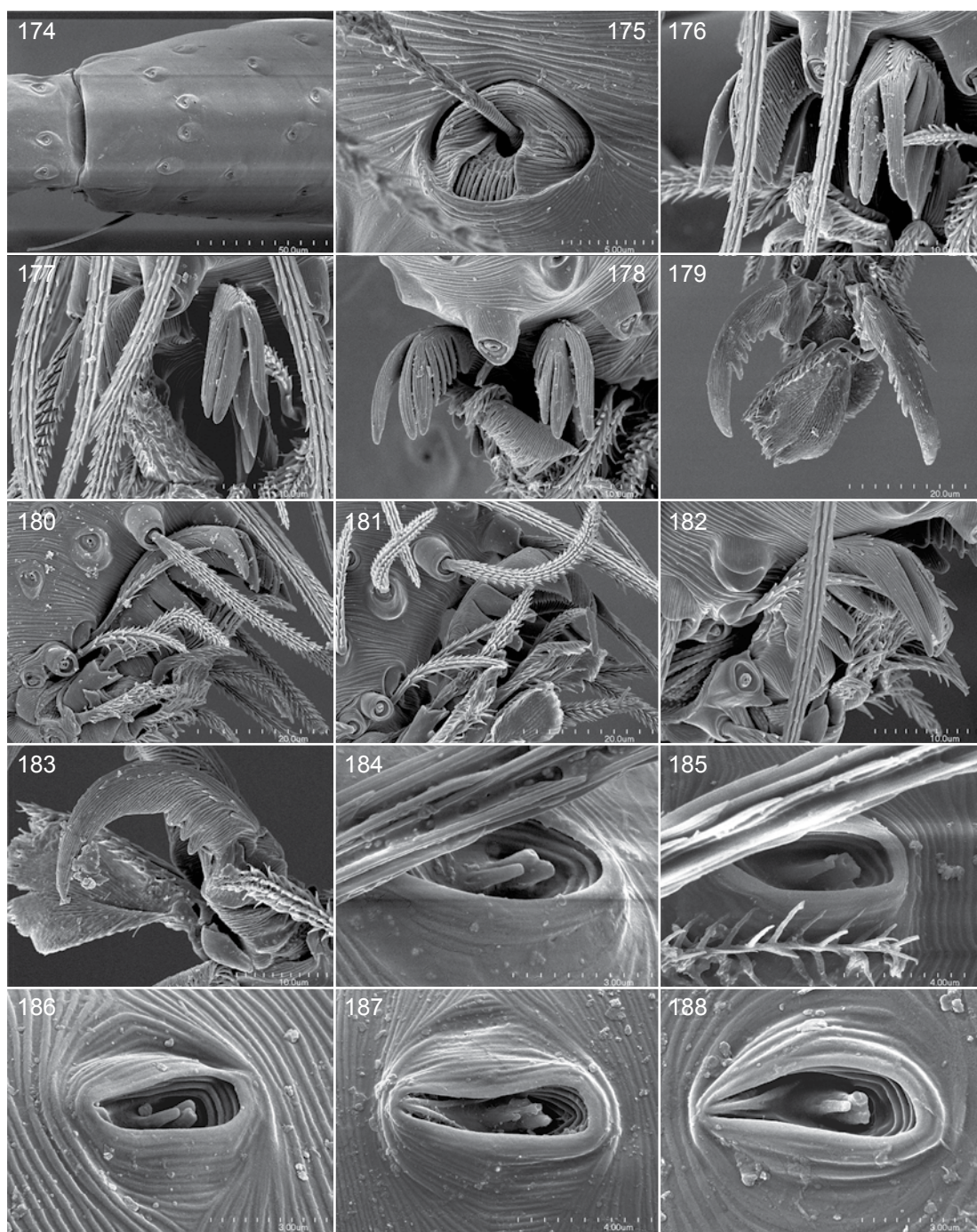
ETYMOLOGY: The generic name is a contraction of *Khamisia* and Madagascar, and is masculine in gender.

DIAGNOSIS: Members of this genus can be recognized by the marginal sternal ridges radiating from the coxal bases (figs. 296, 341, 376, 391, 418, 433, 448) and by their tarsal organs, which usually have only a single raised receptor (figs. 326, 367, 394, 436). The male palp has a conductor and embolus both arising from a common base (figs. 309, 386); the female genitalia have a basally widened anterior receptaculum (figs. 371, 375).

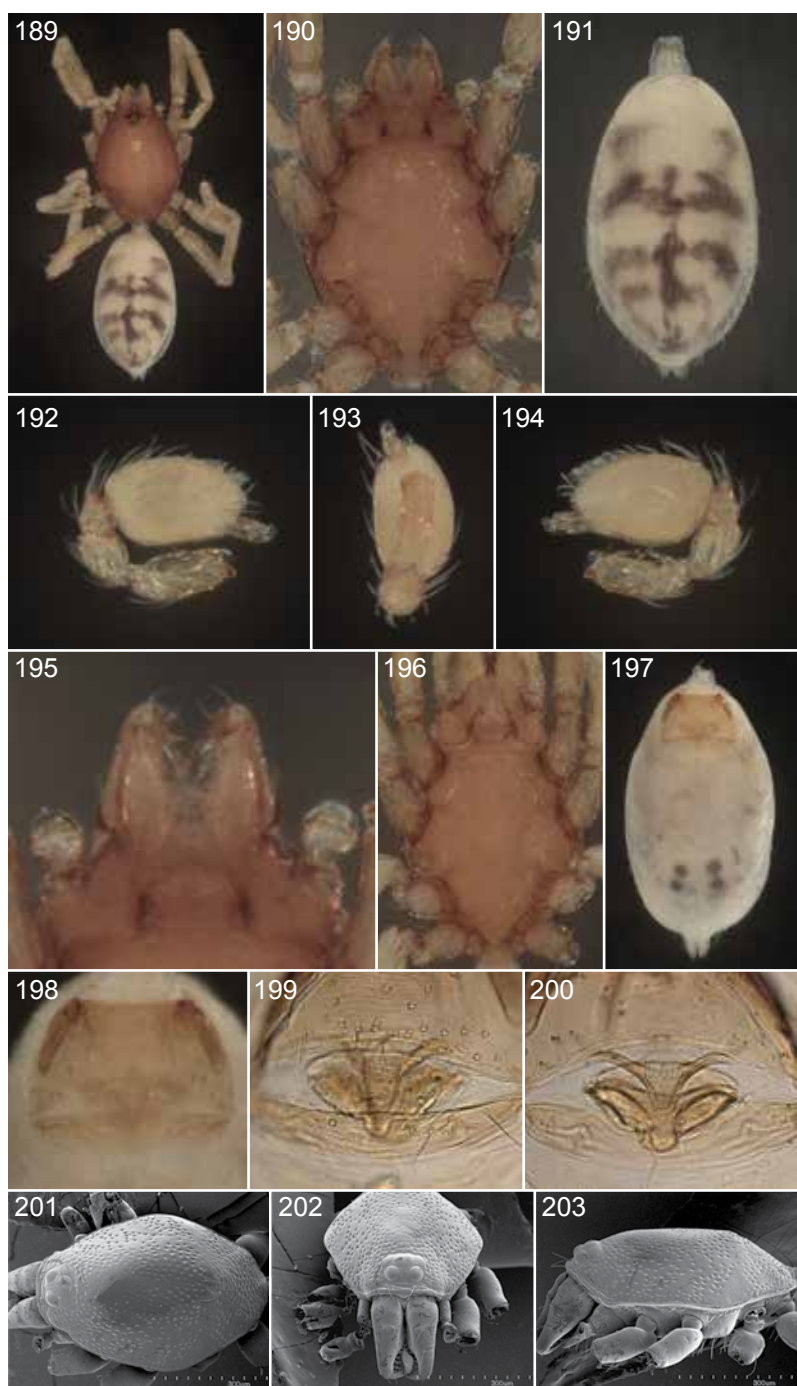
DESCRIPTION: Total length of males 0.8–1.0, of females 0.9–1.4. Cephalothorax and appendages yellow, without pattern, abdomen white except for pale yellow ventral scuta, without pattern. **Cephalothorax**: Carapace elongated hexagonal in dorsal view (figs. 290, 335), pars cephalica flat in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, anterolateral corners with slightly sclerotized triangular projections, pars thoracica with rounded posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes, surface of elevated portion of pars cephalica striated, sides finely reticulate (figs. 292, 337), fovea absent, lateral margin straight, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal setae absent, nonmarginal pars cephalica, pars thoracica setae dark, needlelike, scattered. Clypeus margin unmodified (figs. 291, 336), clypeus curved downward in front view, vertical in lateral view, low, ALE separated from edge of carapace by less than their radius, median projection absent; setae dark, needlelike. Chilum absent. Eyes six, well developed, ALE largest, oval, PME squared, PLE oval; posterior eye row recurved from above, procurved from front (figs. 293, 338); ALE separated by more than their diameter, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum longer than wide, not fused to carapace, median concavity absent, with radial furrows between coxae I-II, II-III, III-IV, furrows wrinkled, radial furrow opposite coxae III absent, surface with marginal ridges radiating, anastomosing, from opposite coxal bases (figs. 296, 341), without pits, microsculpture only at sides, sickle-shaped structures absent, anterior margin with continuous transverse groove, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae II and III much greater than distance between coxae I and II or coxae III and IV (figs. 331, 368), extensions of precoxal triangles absent, lateral margins with rounded extensions between coxae, without posterior hump; setae sparse, dark, needlelike, densest laterally, originating from surface; hair tufts absent. Chelicerae straight, anterior face unmodified (figs. 294, 339); without teeth on



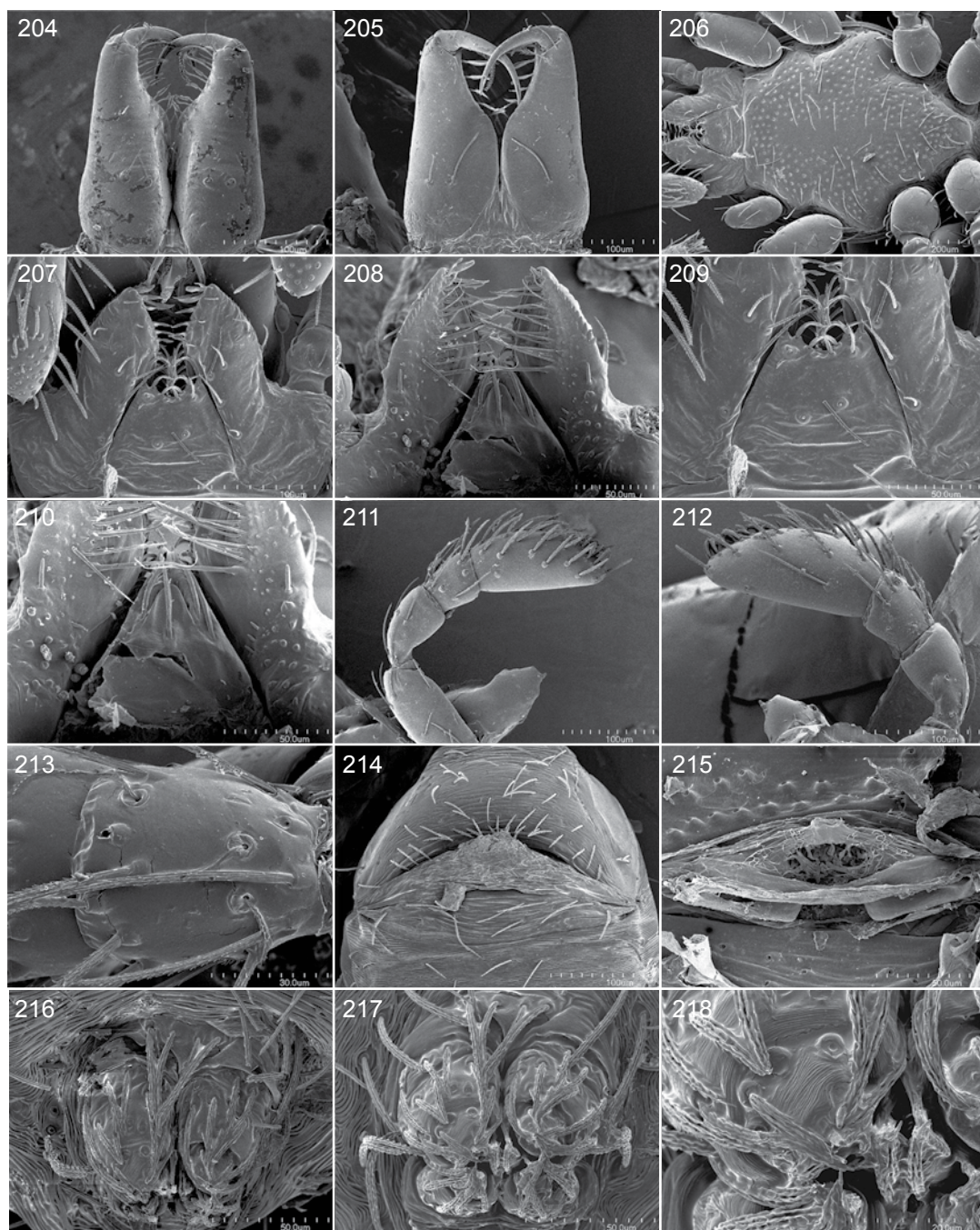
FIGURES 159–173. *Khamisina kivu*, new species, male. 159. Left palp, ventral view. 160. Same, retrolateral view. 161. Left embolus, dorsal view. 162. Same, prolateral view. 163. Same, ventral view. 164. Same, retrolateral view. 165. Epigastric region, ventral view. 166. Spinnerets, same. 167. Same, distal view. 168. Anterior lateral spinneret, same. 169. Posterior median spinneret, same. 170. Posterior lateral spinneret, same. 171. Femur I, dorsal view. 172. Tip of femur I, same. 173. Femur III, same.



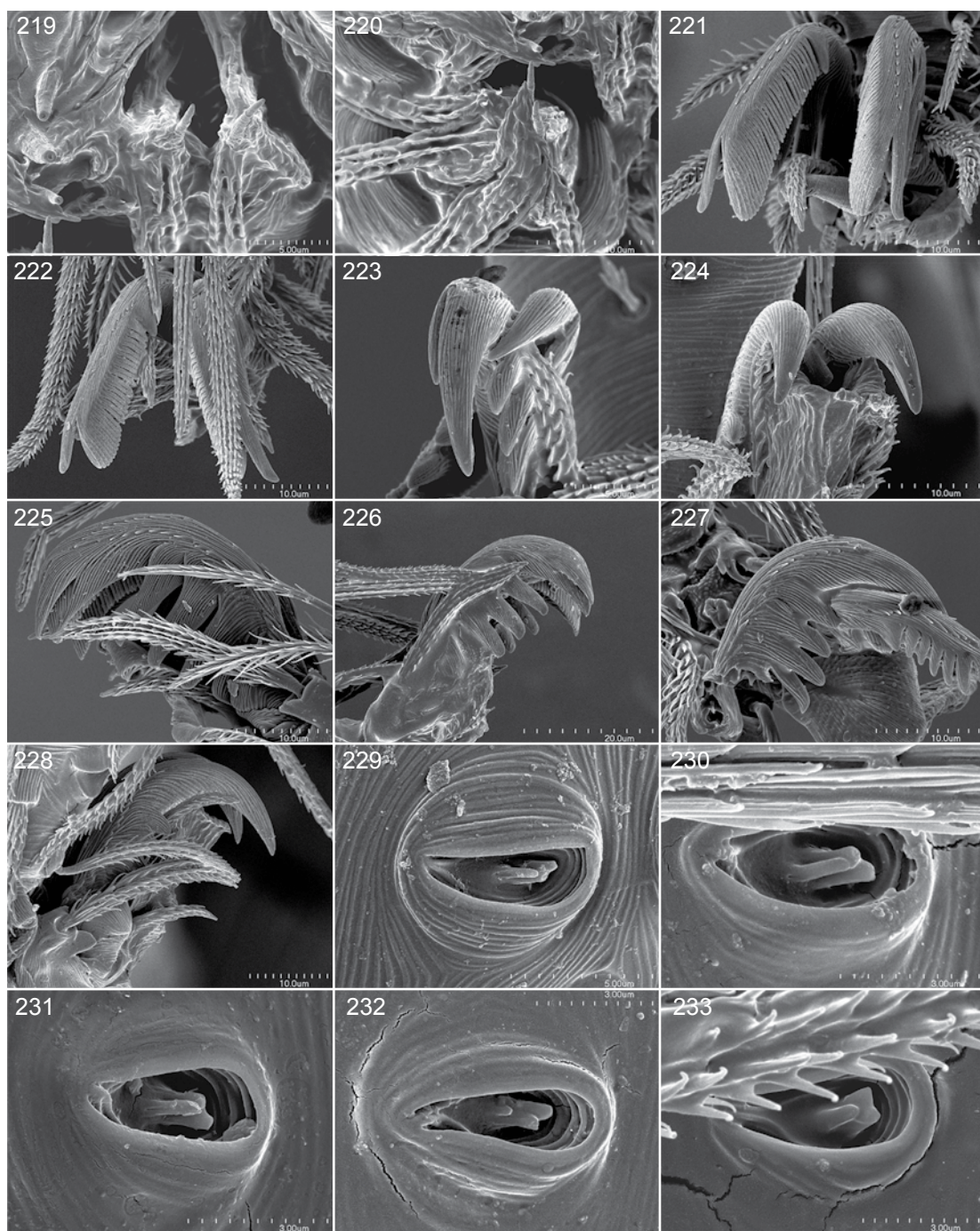
FIGURES 174–188. *Khamisina kivu*, new species, male. **174.** Tip of femur III, dorsal view. **175.** Trichobothrial base from metatarsus I, same. **176.** Claws of leg I, distal view. **177.** Same, leg II. **178.** Same, leg III. **179.** Same, leg IV. **180.** Claws of leg I, lateral view. **181.** Same, leg II. **182.** Same, leg III. **183.** Same, leg IV. **184.** Tarsal organ of leg I, dorsal view. **185.** Same, leg II. **186.** Same, leg III. **187.** Same, leg IV. **188.** Same, palp.



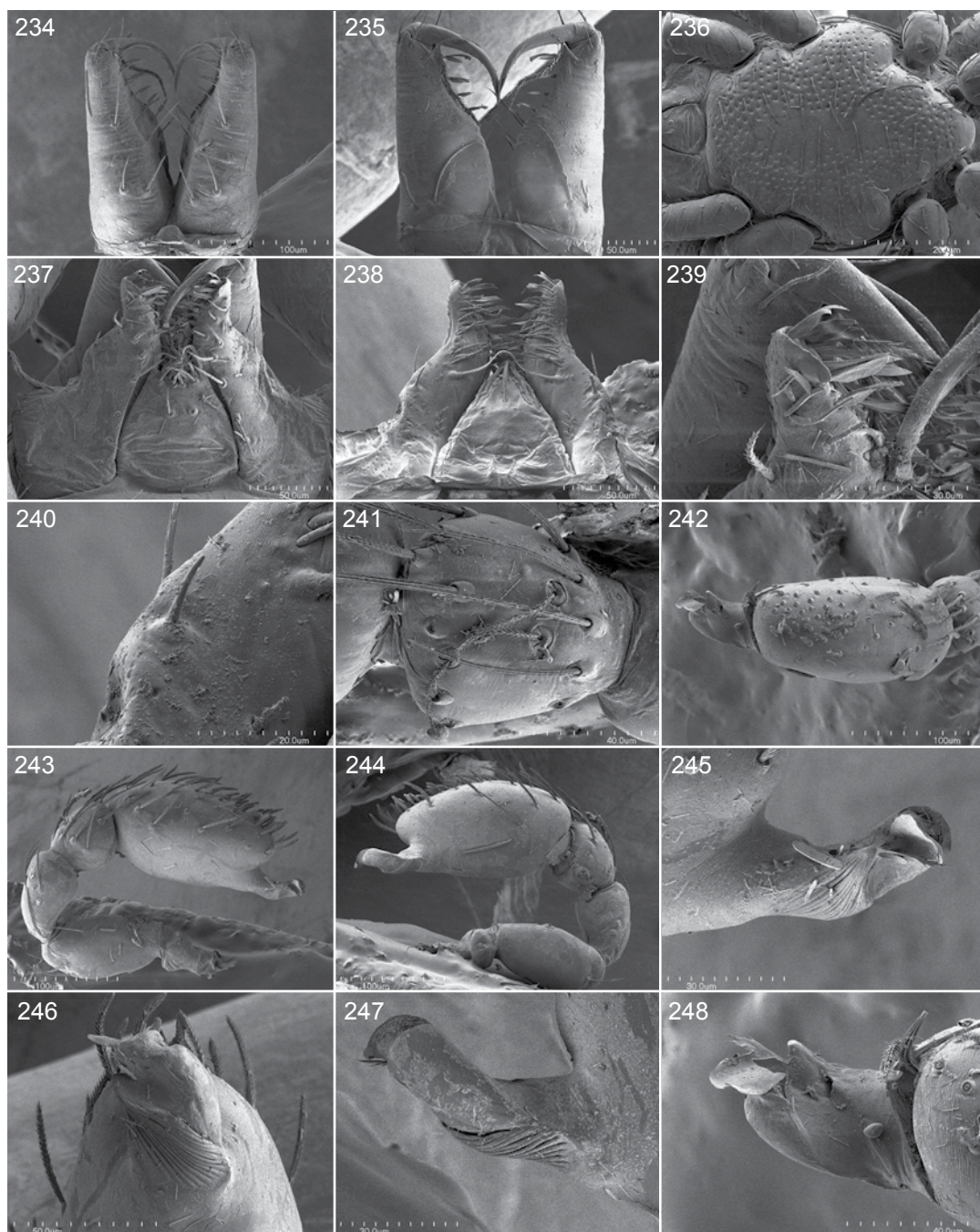
FIGURES 189–203. *Khamisina kivu*, new species, male (189–195) and female (196–203). **189.** Habitus, dorsal view. **190, 196.** Sternum, ventral view. **191.** Abdomen, dorsal view. **192.** Left palp, prolateral view. **193.** Same, ventral view. **194.** Same, retrolateral view. **195.** Mouthparts, ventral view. **197.** Abdomen, same. **198, 199.** Genitalia, same. **200.** Same, dorsal view. **201.** Carapace, dorsal view. **202.** Same, anterior view. **203.** Same, lateral view.



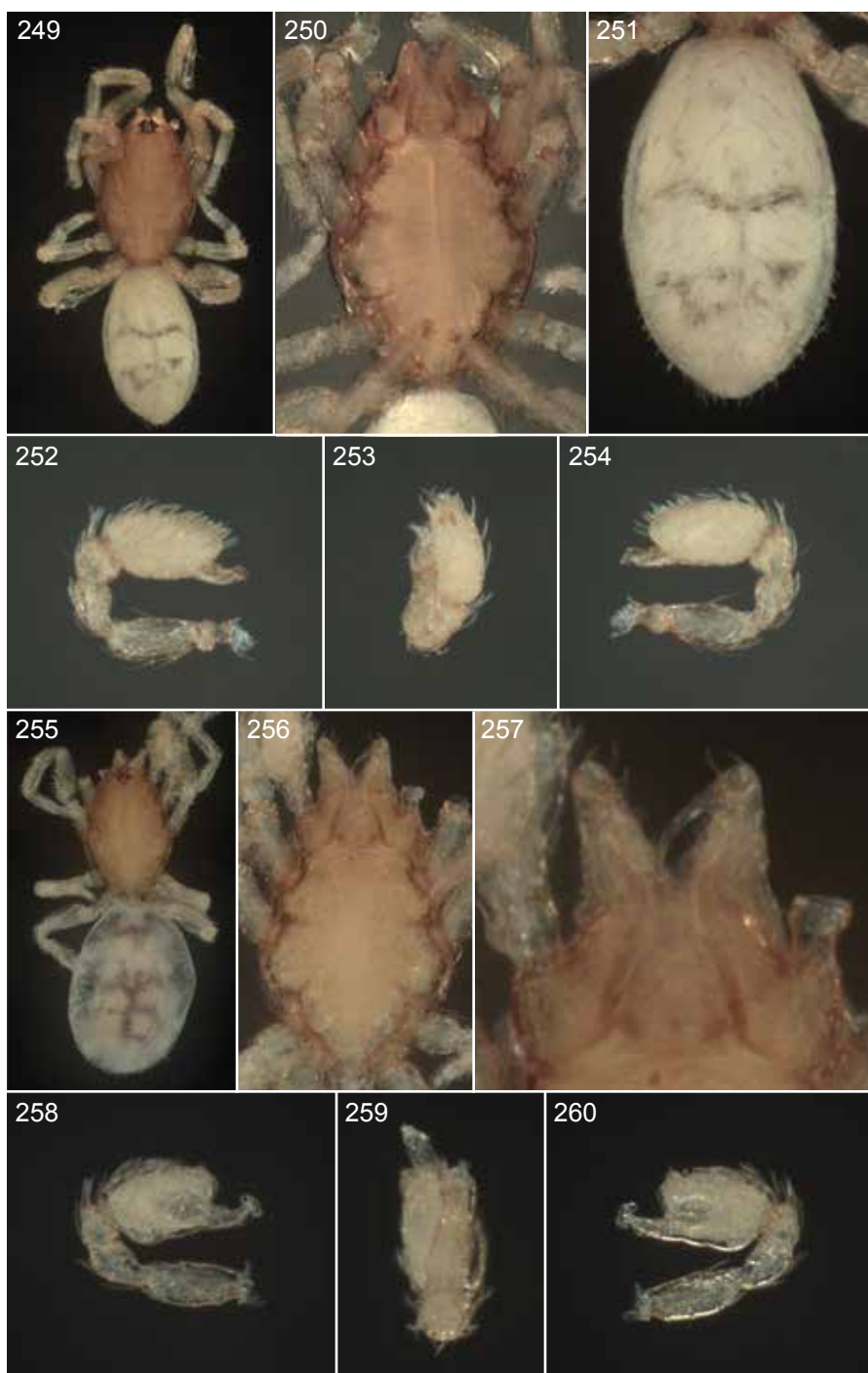
FIGURES 204–218. *Khamisina kivu*, new species, female. **204.** Chelicerae, anterior view. **205.** Same, posterior view. **206.** Sternum, ventral view. **207.** Labium and endites, same. **208.** Labrum and endites, dorsal view. **209.** Labium, ventral view. **210.** Labrum, dorsal view. **211.** Palp, prolateral view. **212.** Same, retrolateral view. **213.** Palpal tibia, dorsal view. **214.** Epigastric area, ventral view. **215.** Internal genitalia, dorsal view. **216.** Spinnerets, ventral view. **217.** Same, distal view. **218.** Anterior lateral spinneret, same.



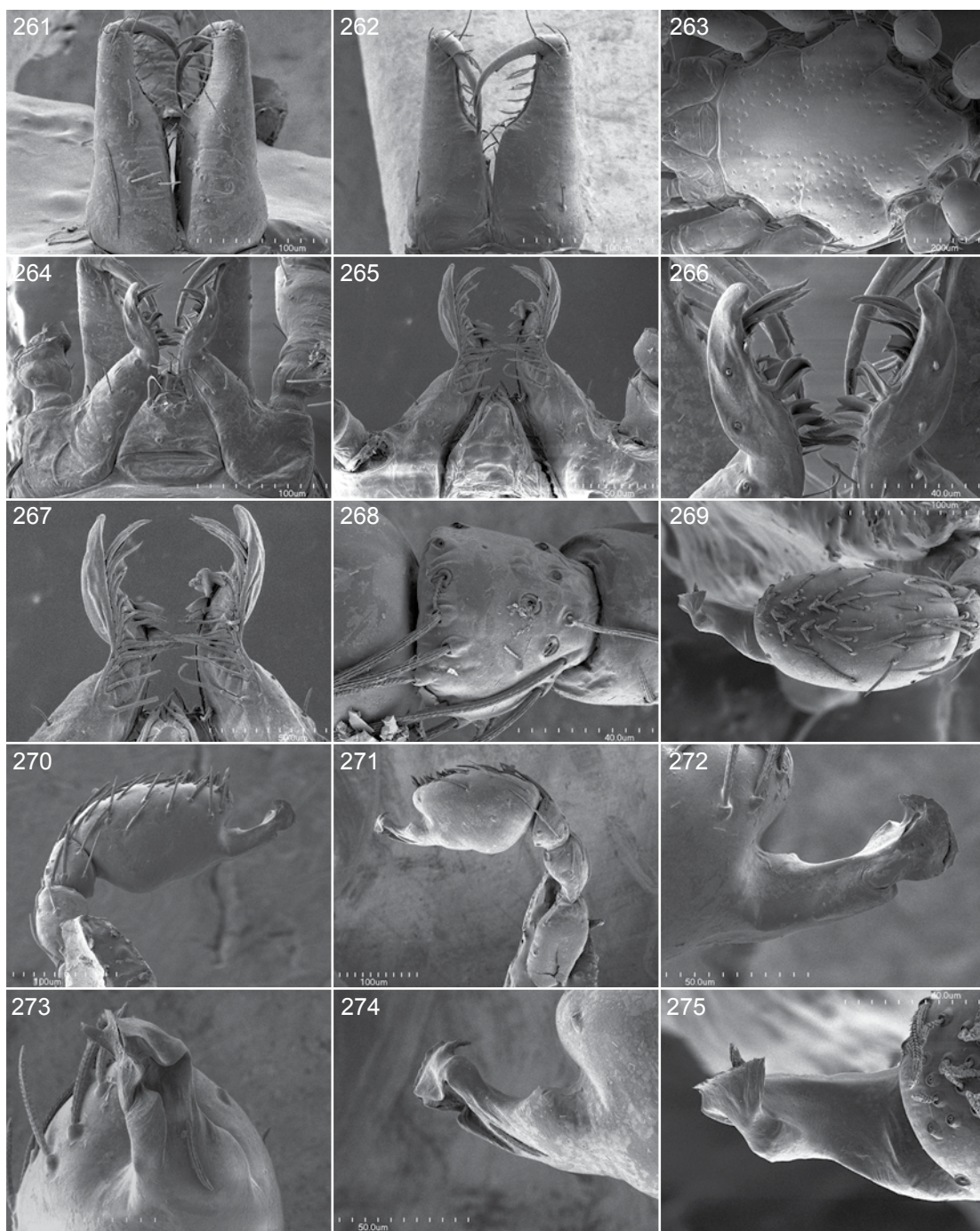
FIGURES 219–233. *Khamisia kivu*, new species, female. **219.** Posterior median spinneret, distal view. **220.** Posterior lateral spinneret, same. **221.** Claws of leg I, same. **222.** Same, leg II. **223.** Same, leg III. **224.** Same, leg IV. **225.** Claws of leg I, lateral view. **226.** Same, leg II. **227.** Same, leg III. **228.** Same, leg IV. **229.** Tarsal organ of leg I, dorsal view. **230.** Same, leg II. **231.** Same, leg III. **232.** Same, leg IV. **233.** Same, palp.



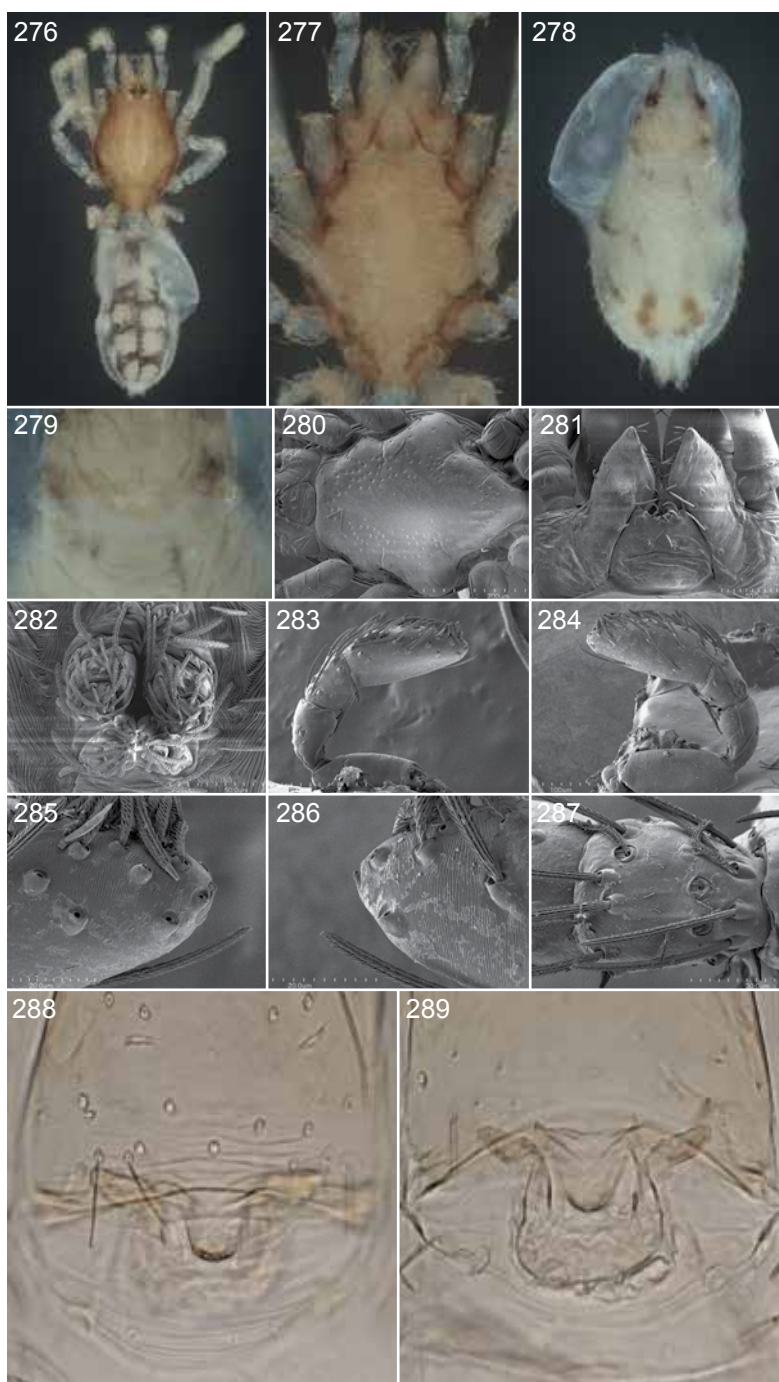
FIGURES 234–248. *Khamisina kilifi*, new species, male. 234. Chelicerae, anterior view. 235. Same, posterior view. 236. Sternum, ventral view. 237. Labium and endites, same. 238. Labrum and endites, dorsal view. 239. Tip of endite, ventral view. 240. Base of endite, dorsal view. 241. Palpal tibia, same. 242. Left palp, same. 243. Same, prolateral view. 244. Same, retrolateral view. 245. Left embolus, prolateral view. 246. Same, ventral view. 247. Same, retrolateral view. 248. Same, dorsal view.



FIGURES 249–260. 249–254. *Khamisina kilifi*, new species, male. 255–260. *K. ibadan*, new species, male. 249, 255. Habitus, dorsal view. 250, 256. Sternum, ventral view. 251. Abdomen, dorsal view. 252, 258. Left palp, prolateral view. 253, 259. Same, ventral view. 254, 260. Same, retrolateral view. 257. Mouthparts, ventral view.



FIGURES 261–275. *Khamisina ibadan*, new species, male. **261.** Chelicerae, anterior view. **262.** Same, posterior view. **263.** Sternum, ventral view. **264.** Labium and endites, same. **265.** Labrum and endites, dorsal view. **266.** Tip of endites, ventral view. **267.** Same, dorsal view. **268.** Palpal tibia, same. **269.** Left palp, same. **270.** Same, prolateral view, ventral view. **271.** Same, retrolateral view. **272.** Left embolus, prolateral view. **273.** Same, ventral view. **274.** Same, retrolateral view. **275.** Same, dorsal view.



FIGURES 276–289. *Khamisina ibadan*, new species, female. **276.** Habitus, dorsal view. **277, 280.** Sternum, ventral view. **278.** Abdomen, same. **279, 288.** Genitalia, same. **281.** Labium and endites, same. **282.** Spinnerets, distal view. **283.** Palp, prolateral view. **284.** Same, retrolateral view. **285.** Tip of palpal tarsus, prolateral view. **286.** Same, retrolateral view. **287.** Palpal tibia, dorsal view. **289.** Genitalia, same.

promargin or retromargin; fangs without toothlike projections, directed medially, slightly elongated, without prominent basal process, tip with elongated venom gland opening (figs. 295, 340), setae dark, needlelike, evenly scattered; paturon inner margin with few, paired, enlarged setae, distal region abruptly narrowed (figs. 294, 339), posterior surface unmodified, promargin with row of flattened setae, inner margin unmodified, laminate groove absent. Labium triangular, fused to sternum (figs. 297, 342), anterior margin indented at middle (figs. 300, 342), same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally not excavated, same as sternum in sclerotization, serula absent in both sexes (figs. 298, 343), anteromedian tip of males with one or more weak, subterminal ridges (fig. 299), flattened setae on tip without forklike tines, posteromedian part unmodified. Labrum with flattened, triangular basal projection (figs. 301, 343). Female palp without claw or spines (figs. 344, 345); patella without prolateral row of ridges; tibia with three trichobothria (fig. 346), tarsus unmodified. **Abdomen:** Cylindrical, without long posterior extension, but females often with contents shrunk, leaving empty space under cuticle (fig. 414), rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent posteriorly. Book lung covers large, ovoid, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove (figs. 311, 347). Pedicel tube short, unmodified, scutopedicel region unmodified, scutum not extending far dorsal of pedicel, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum absent. Epigastric scutum weakly sclerotized, not surrounding pedicel, not protruding, small lateral sclerites absent, scutum of females without lateral joints. Postepigastric scutum weakly sclerotized, short, only around epigastric furrow, not fused to epigastric scutum (fig. 369), anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum absent. Supraanal scutum absent. Abdominal setae dark, needlelike, epigastric area setae not basally thickened. Dense patch of setae anterior to spinnerets absent. Colulus present. Six spinnerets, anterior laterals bisegmented, basal segment with oblique membranous strip (figs. 312, 350), posterior medians unisegmented, posterior laterals bisegmented (figs. 313, 351), anterior laterals with one major ampullate gland spigot and two piriform gland spigots (figs. 314, 352, 435), posterior medians with one spigot (figs. 315, 353, 378, 393, 435), posterior laterals with two spigots (figs. 316, 354, 435). **Legs:** Femora without subdistal constriction or subdistal transverse row of setae (figs. 463–469); femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex, ventral scopula both absent, metatarsi I, II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent. Leg spines absent. Tarsi I to IV without inferior claw. Superior claws with outer row of three or four large, blunt-tipped teeth, inner row with distal series of closely spaced, narrow teeth (figs. 318–325, 355–362). Tarsal organs with single long raised receptor, proximal portion flat, distal portion erect (figs. 326–330, 363–367). Trichobothrial base with triangular opening, distal rim unridged (fig. 317). **Genitalia:** Male epigastric region with sperm pore not visible; furrow without Ω -shaped insertions, without setae. Male palp normal size, not strongly sclerotized, right and left palps mirror images; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly

rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria (fig. 302); cymbium ovoid in dorsal view, completely fused with bulb, no seam visible (figs. 304–306), not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent; bulb 1–1.5 times as long as cymbium, stout, spherical; embolus light (figs. 332–334), without prolateral excavation, embolus and conductor arising from single base, conductor often bifid (figs. 303, 307–310). Females with basally wide anterior receptaculum (figs. 348, 349, 370, 371).

DISTRIBUTION: Madagascar.

Key to Species of *Khamiscar*

1. Males.....	2
– Females (unknown in <i>kiri</i> , <i>baly</i> , and <i>ambi</i>).....	7
2. Conductor long, narrow, excavated only at tip (figs. 404, 428).....	3
– Conductor wider or bifurcating well before tip (figs. 309, 386, 443, 458)	4
3. Excavation on conductor tip shallow (fig. 428).....	<i>kiri</i>
– Excavation on conductor tip deeper (fig. 404)	<i>tola</i>
4. Base of conductor narrow, tip deeply bifid (figs. 309, 386).....	5
– Base of conductor wider, tip shallowly bifid (figs. 443, 458).....	6
5. Bifid arms of conductor each long (fig. 386).....	<i>maro</i>
– Bifid arms of conductor shorter (fig. 309).....	<i>anta</i>
6. Distal arm of conductor tip wide (fig. 443).....	<i>baly</i>
– Distal arm of conductor tip narrower (fig. 458).....	<i>ambi</i>
7. Anterior receptaculum short, with flat tip (fig. 375).....	<i>maro</i>
– Anterior receptaculum longer (figs. 371, 417).....	8
8. Anterior receptaculum gradually narrowed anteriorly (fig. 371).....	<i>anta</i>
– Anterior receptaculum abruptly narrowed anteriorly (fig. 417).....	<i>tola</i>

Khamiscar anta, new species

Figures 290–371, 463–469

TYPES: Male holotype, female allotype, six male paratypes, and five female paratypes extracted from leaf litter taken in a gallery forest at an elevation of 60 m at Antafoky, 23°28'45"S, 44°03'58"E, Atsimo-Andrefana, Toliara, Madagascar (Jan. 26, 2002; Frontier Project), deposited in CAS (10380, PBI_OON 2361).

ETYMOLOGY: The specific name is a noun in apposition shortened from the type locality.

DIAGNOSIS: Males are most easily recognized by the shape of the palpal conductor in ventral view (fig. 309): the tip is deeply bifid, with a V-shaped incision between the arms. Females have a long anterior receptaculum, with an expanded tip (figs. 348, 349, 371).

MALE (PBI_OON 2361, figs. 290–334, 463–466): Total length 0.91. Endites with subterminal ridge. Palpal conductor with deeply bifid tip.

FEMALE (PBI_OON 2361, figs. 335–371, 467–469): Total length 1.06. Anterior receptaculum long, expanded at tip.

OTHER MATERIAL EXAMINED: MADAGASCAR: **Toliara:** *Atsimo-Andrefana:* Fiherenana, 23°10'37"S, 43°57'39"E, Nov. 3–7, 2002, gallery forest, sifted litter (leaf mold, rotten wood), elev. 100 m (Frontier Wilderness Project, CAS 23335, PBI_OON 2348), 1 ♀, 23°14'07"S, 43°52'15"E, Dec. 1–4, 2002, degraded gallery forest, sifted litter, elev. 50 m (Frontier Project, CAS 11413, PBI_OON 2346), 1 ♂; Forêt de Beroboka, 5.9 km 131° SE Ankidranoka, 22°13'56"S, 43°21'59"E, Mar. 12–16, 2002, tropical dry forest, sifted litter (leaf mold, rotten wood), elev. 80 m (B. Fisher et al., CAS 10886, PBI_OON 2356), 7 ♂, 2 ♀; Forêt de Mite, 20.7 km 29° WNW Tongobory, 23°31'27"S, 44°7'17"S, Feb. 27–Mar. 3, 2002, gallery forest, sifted litter (leaf mold, rotten wood), elev. 75 m (B. Fisher et al., CAS 10322, PBI_OON 1991), 3 ♂, 1 ♀; Forêt de Tsinjoriaky, 6.2 km 84° E Tsifota, 22°48'08"S, 43°25'14"E, Mar. 6–10, 2002, spiny forest/thicket, sifted litter (leaf mold, rotten wood), elev. 70 m (B. Fisher et al., CAS 10282, PBI_OON 2347), 20 ♂, 9 ♀; Mahafaly Plateau, 6.2 km 74° ENE Itampolo, 24°39'13"S, 43°59'48"E, Feb. 21–25, 2002, spiny forest/thicket, sifted litter (leaf mold, rotten wood), elev. 80 m (B. Fisher et al., CAS 10335, PBI_OON 2364), 1 ♂, 1 ♀; Manderano, 23°31'38"S, 44°05'15"E, May 10, 2002, gallery forest, sifted litter (leaf mold, rotten wood), elev. 70 m (Frontier Project, CAS 11388, PBI_OON 2355), 1 ♀, 23°31'27"S, 44°05'34"E, May 29, 2002, gallery forest, sifted litter (leaf mold, rotten wood), elev. 75 m (Frontier Project, CAS 11391, PBI_OON 2351), 1 ♀, 23°31'24"S, 44°05'40"E, June 8, 2002, spiny thicket, sifted litter (leaf mold, rotten wood), elev. 80 m (Frontier Project, CAS 11399, PBI_OON 2349), 1 ♂, 1 ♀; Parc National de Tsimanampetsotsa, Forêt de Bemanateza, 20.7 km 81° E Efoetse, 23.0 km 131° SE Beheloka, 23°59'32"S, 43°52'50"E, Mar. 22–26, 2002, spiny forest/thicket, sifted litter (leaf mold, rotten wood), pitfall trap, elev. 90 m (B. Fisher et al., CAS 11367, 10297, PBI_OON 2359, 2368), 3 ♂, 5 ♀; Ranobe, 23°02'22"S, 43°36'37"E, Jan. 5–28, 2003, spiny forest/thicket, sifted litter (leaf mold, rotten wood), elev. 30 m (Frontier Project, CAS 11457, PBI_OON 2365), 1 ♂, 23°02'03"S, 43°36'43"E, Feb. 5–9, 2003, spiny forest/thicket, sifted litter (mold, rotten wood), elev. 30 m (Frontier Project, CAS 11489, PBI_OON 2342), 3 ♂, 6 ♀, 23°02'23"S, 43°36'39"E, Feb. 17–21, 2003, spiny forest/thicket, sifted litter (leaf mold, rotten wood), elev. 30 m (Frontier Project, CAS 11482, PBI_OON 2366), 2 ♂, 1 ♀, 23°02'21"S, 43°36'42"E, Apr. 25–28, 2003, spiny forest/thicket, sifted litter (leaf mold, rotten wood), elev. 30 m (Frontier Project, CAS 1472, PBI_OON 2360), 2 ♂, 23°02.440'S, 43°36.584'E, May 17–21, 2003, riparian forest, leaf litter, elev. 20 m (Frontier Project, CAS 11468, PBI_OON 2350), 1 ♂, 2 ♀; Sept Lacs, 23°31'42"S, 44°09'20"E, Mar. 8, 2002, gallery forest, leaf litter extraction, elev. 80 m (Frontier Project, CAS 10893, PBI_OON 2353), 2 ♂, 23°31'29"S, 44°09'33"E, Mar. 10, 2002, spiny thicket/gallery forest transition, leaf litter extraction, elev. 160 m (Frontier Project, CAS 10393, PBI_OON 2367), 1 ♂.

DISTRIBUTION: Southwestern Madagascar.

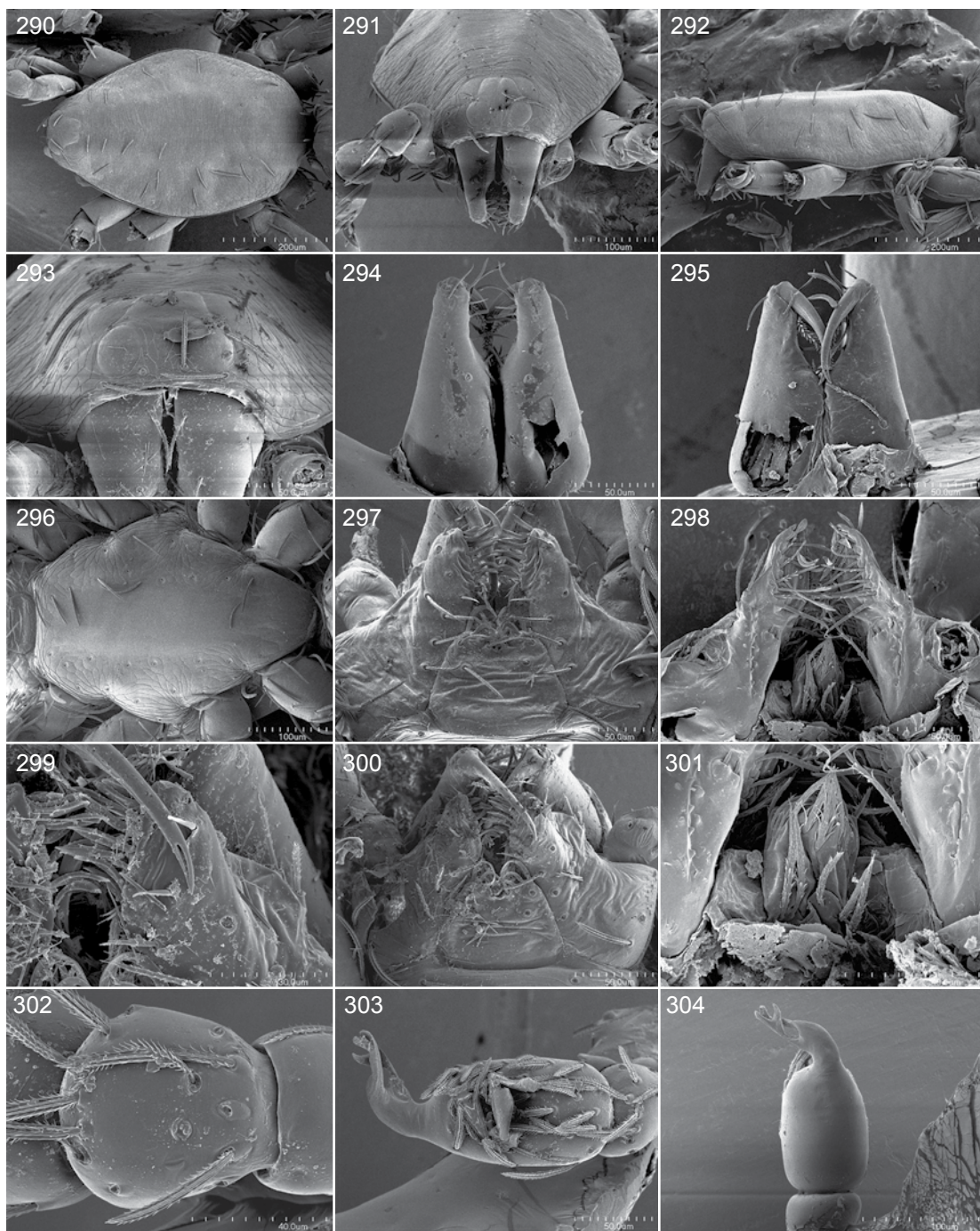
Khamiscar maro, new species

Figures 372–390

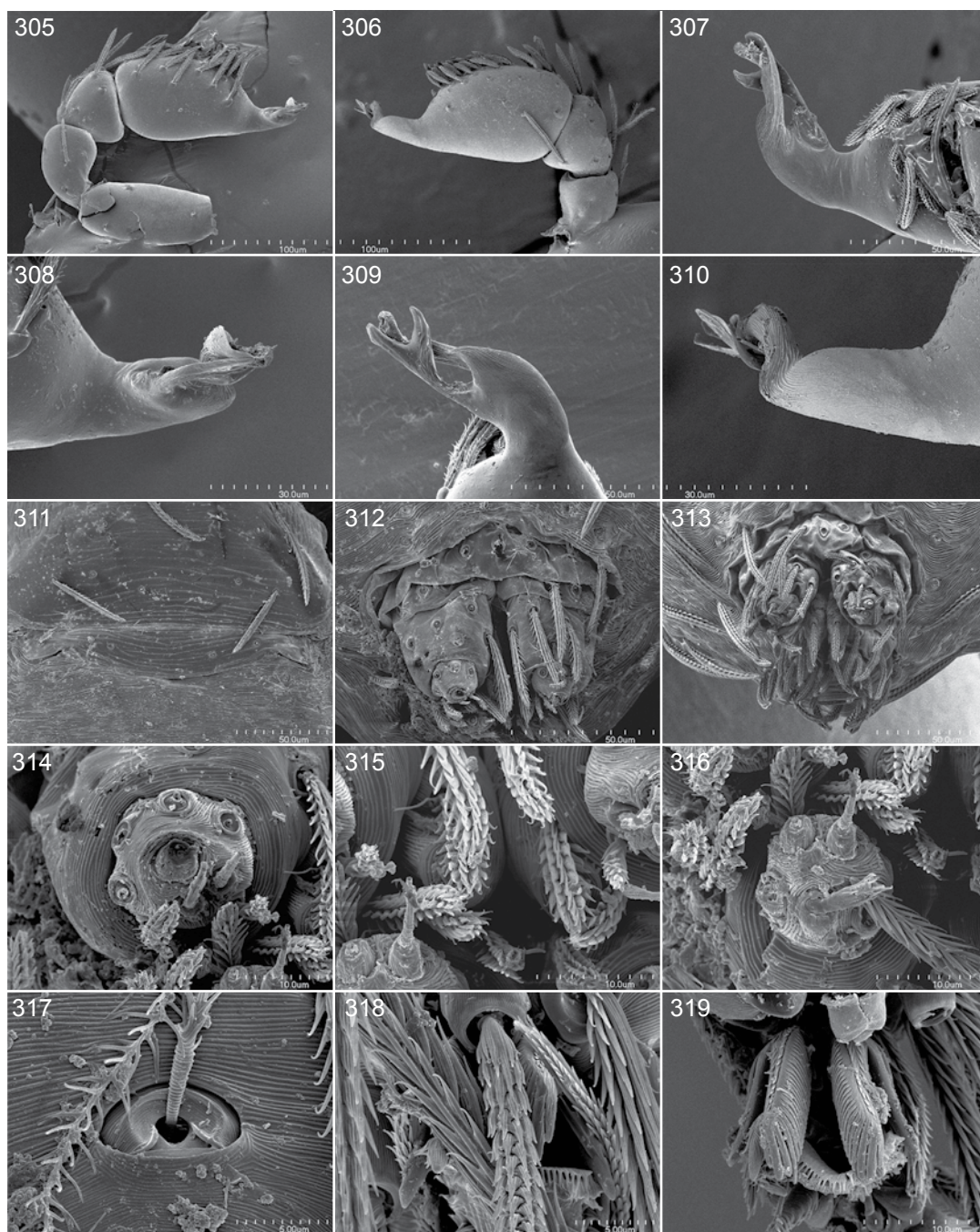
TYPES: Male holotype, female allotype, and two female paratypes from sifted litter and rotten wood taken in a spiny forest/thicket at an elevation of 160 m at Reserve Spéciale de Cap Sainte Marie, 14.9 km 261° W Marovato, 25°35'40"S, 45°08'49"E (Feb. 13–19, 2002; B. Fisher et al.), deposited in CAS (10309, PBI_OON 2354).

ETYMOLOGY: The specific name is a noun in apposition shortened from the type locality.

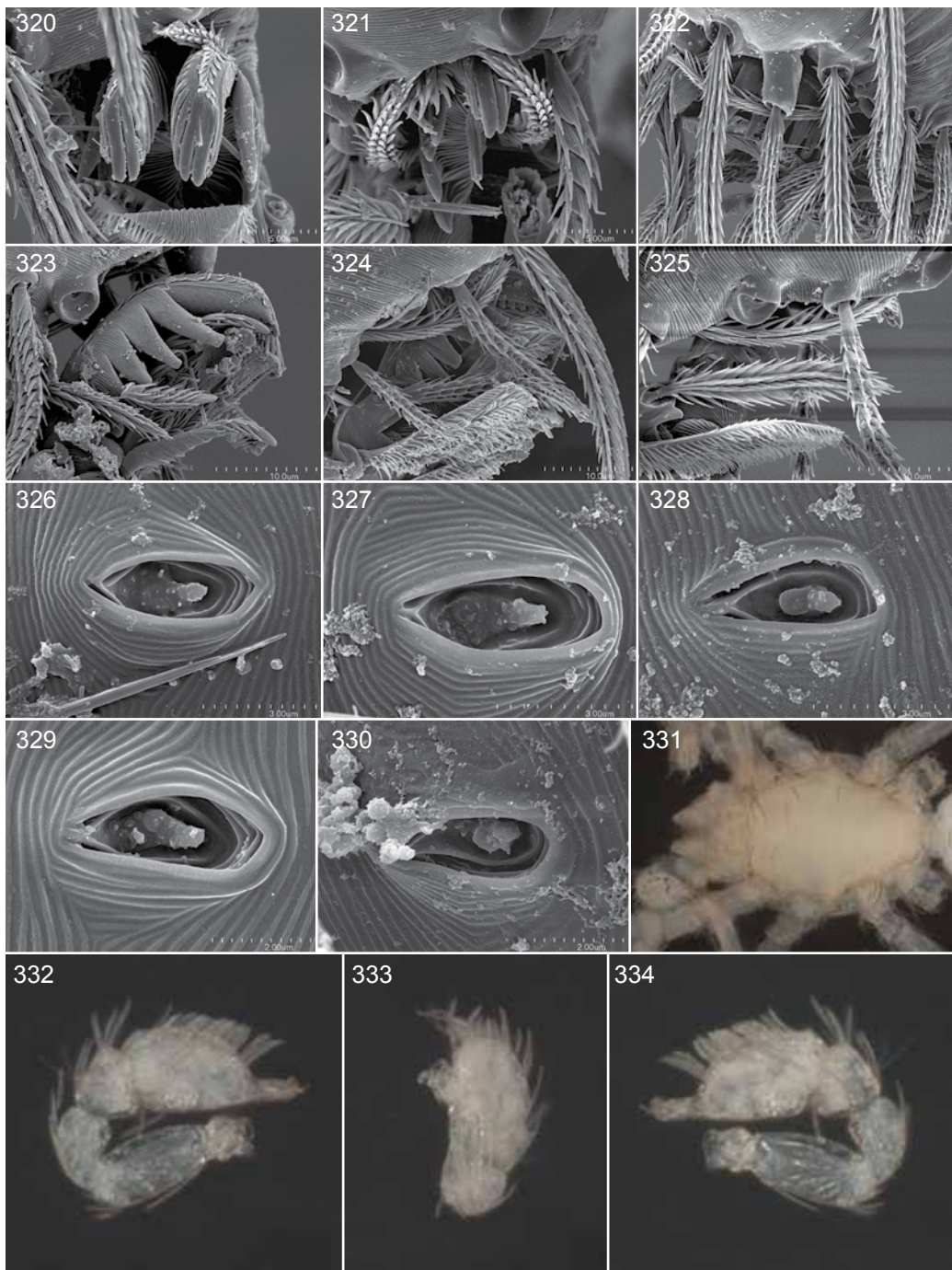
DIAGNOSIS: Males are most easily recognized by the shape of the palpal conductor in ventral view (fig. 386): the tip resembles that of *K. anta* in being deeply bifid, but the dorsal prong of the conductor tip is much longer and straighter. Females have a short, flat-tipped anterior receptaculum (fig. 375).



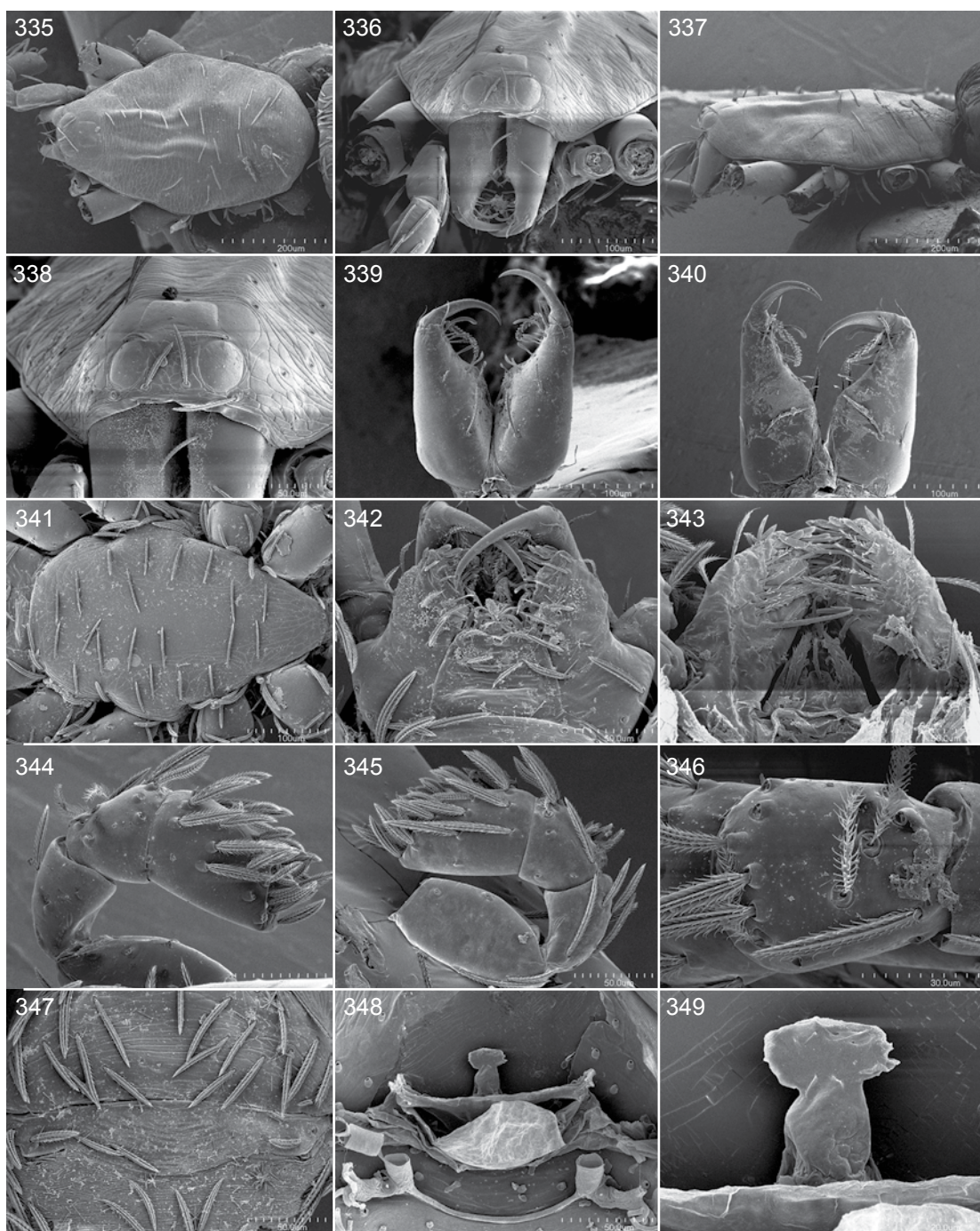
FIGURES 290–304. *Khamiscar anta*, new species, male. **290.** Carapace, dorsal view. **291.** Same, anterior view. **292.** Same, lateral view. **293.** Eye group, anterior view. **294.** Chelicerae, same. **295.** Same, posterior view. **296.** Sternum, ventral view. **297.** Mouthparts, same. **298.** Endites, dorsal view. **299.** Tip of endites, ventral view. **300.** Labium, same. **301.** Labrum, dorsal view. **302.** Palpal tibia, same. **303.** Left palp, same. **304.** Same, ventral view.



FIGURES 305–319. *Khamiscar anta*, new species, male. **305.** Left palp, prolateral view. **306.** Same, retrolateral view. **307.** Left embolus, dorsal view. **308.** Same, prolateral view. **309.** Same, ventral view. **310.** Same, retrolateral view. **311.** Epigastric region, ventral view. **312.** Spinnerets, same. **313.** Same, distal view. **314.** Anterior lateral spinneret, same. **315.** Posterior median spinneret, same. **316.** Posterior lateral spinneret, same. **317.** Trichobothrial base from metatarsus II, dorsal view. **318.** Claws of leg I, distal view. **319.** Same, leg II.



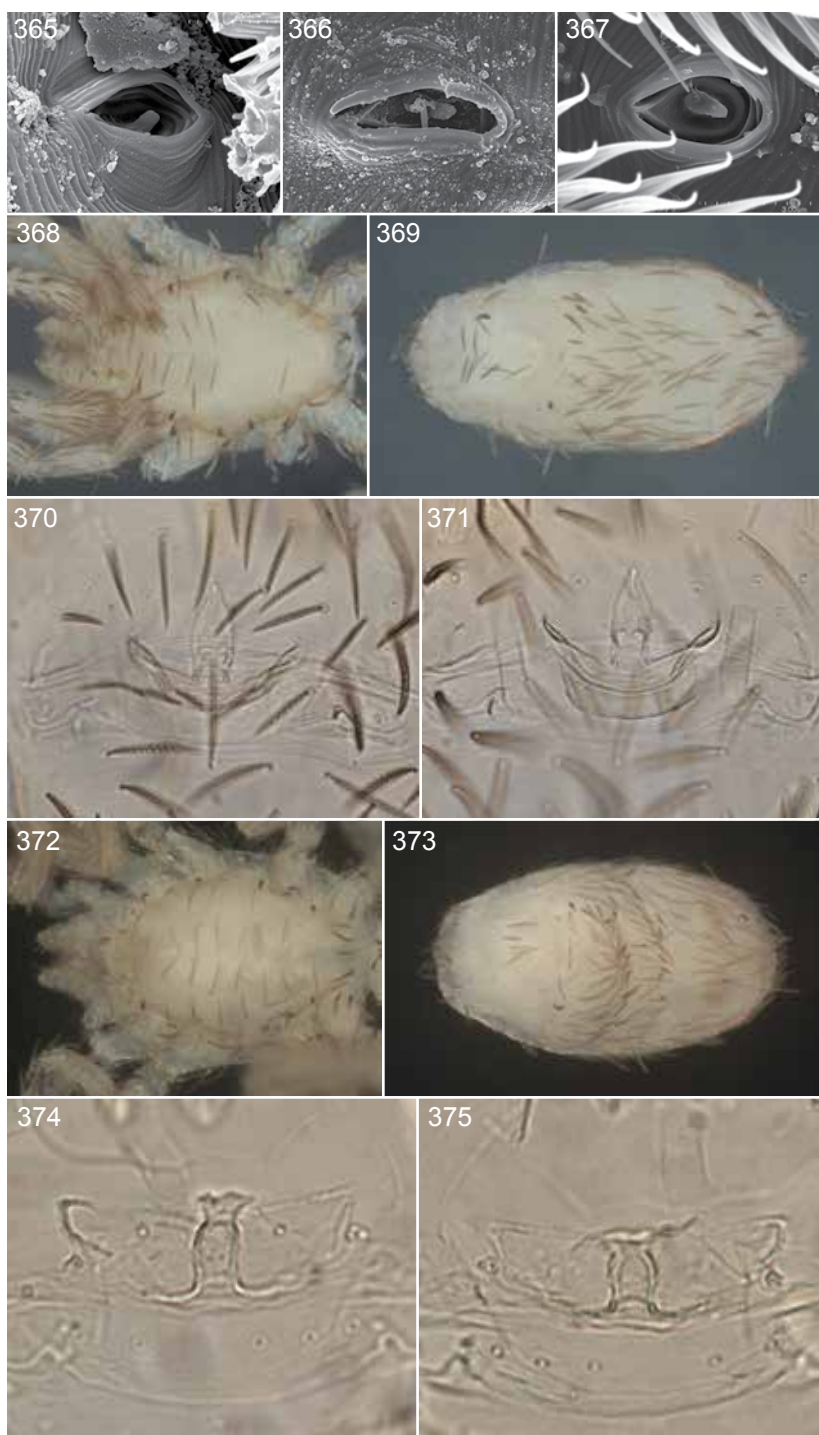
FIGURES 320–334. *Khamiscar anta*, new species, male. **320.** Claws of leg III, distal view. **321.** Same, leg IV. **322.** Claws of leg I, lateral view. **323.** Same, leg II. **324.** Same, leg III. **325.** Same, leg IV. **326.** Tarsal organ of leg I, dorsal view. **327.** Same, leg II. **328.** Same, leg III. **329.** Same, leg IV. **330.** Same, palp. **331.** Sternum, ventral view. **332.** Left palp, prolateral view. **333.** Same, ventral view. **334.** Same, retrolateral view.



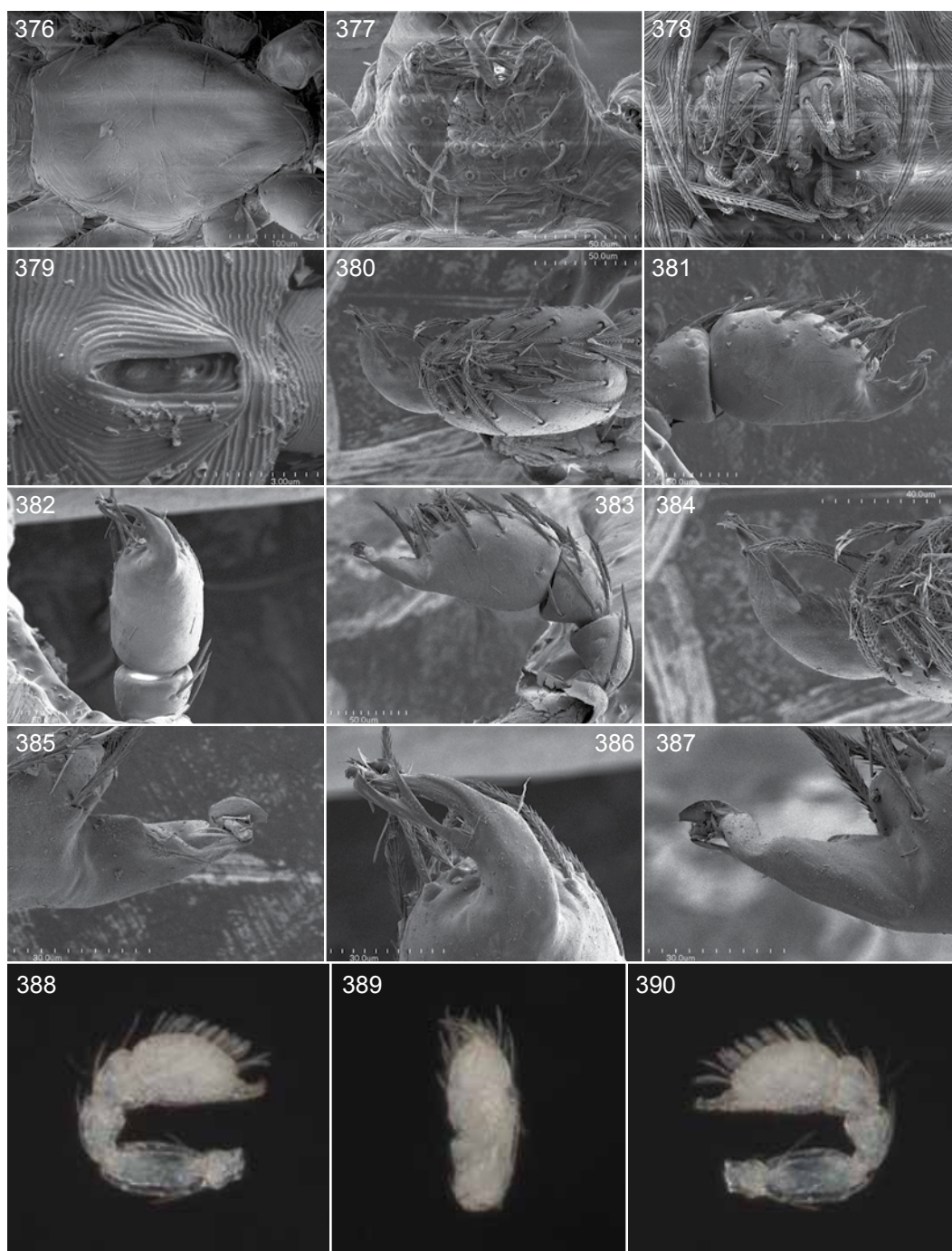
FIGURES 335–349. *Khamiscar anta*, new species, female. 335. Carapace, dorsal view. 336. Same, anterior view. 337. Same, lateral view. 338. Eye group, anterior view. 339. Chelicerae, same. 340. Same, posterior view. 341. Sternum, ventral view. 342. Mouthparts, same. 343. Endites, dorsal view. 344. Palp, prolateral view. 345. Same, retrolateral view. 346. Palpal tibia, dorsal view. 347. Epigastric area, ventral view. 348. Internal genitalia, dorsal view. 349. Anterior receptaculum, same.



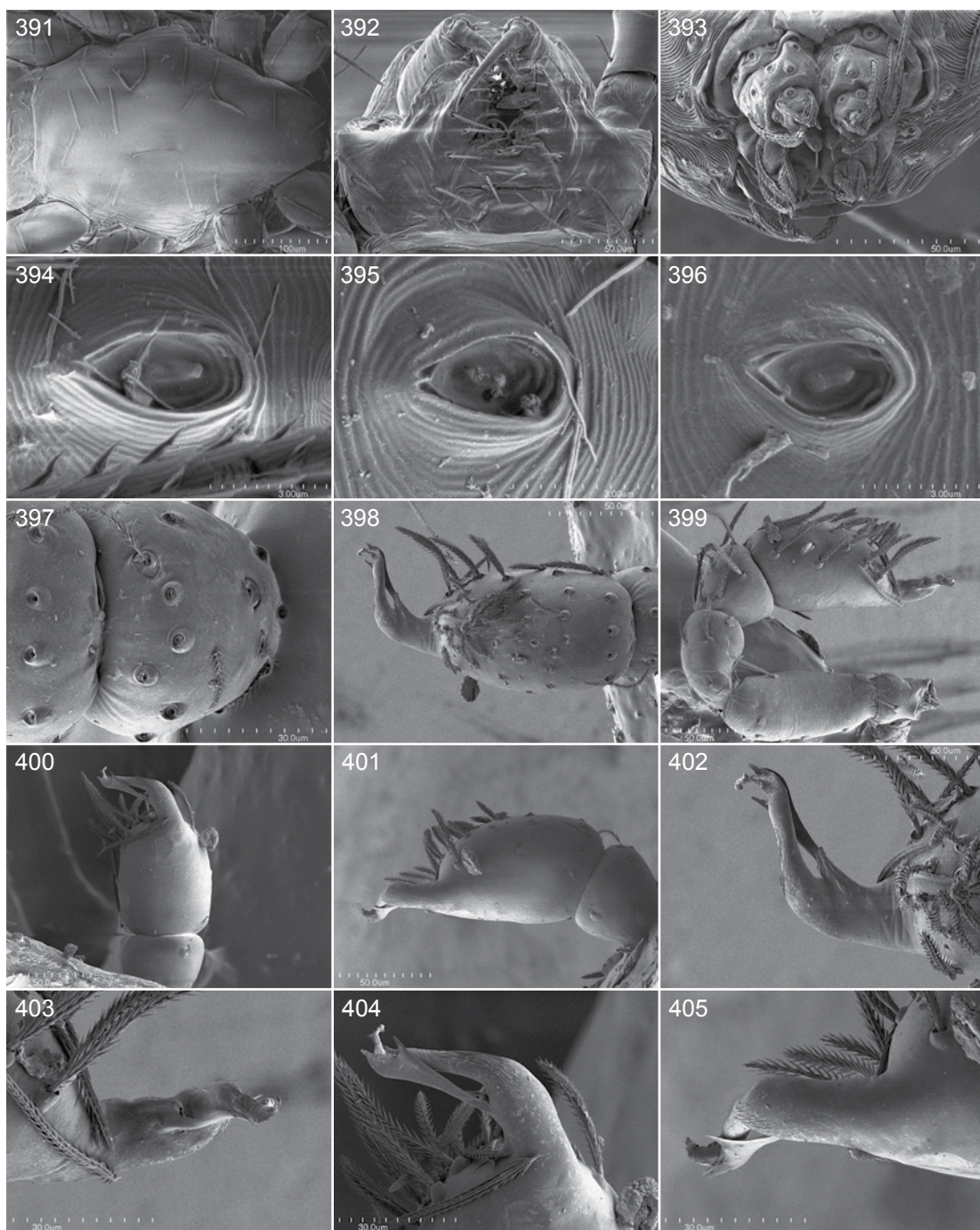
FIGURES 350–364. *Khamiscar anta*, new species, female. **350.** Spinnerets, ventral view. **351.** Same, distal view. **352.** Anterior lateral spinneret, same. **353.** Posterior lateral spinneret, same. **354.** Posterior median spinneret, same. **355.** Claws of leg I, distal view. **356.** Same, leg II. **357.** Same, leg III. **358.** Same, leg IV. **359.** Claws of leg I, lateral view. **360.** Same, leg II. **361.** Same, leg III. **362.** Same, leg IV. **363.** Tarsal organ of leg I, dorsal view. **364.** Same, leg II.



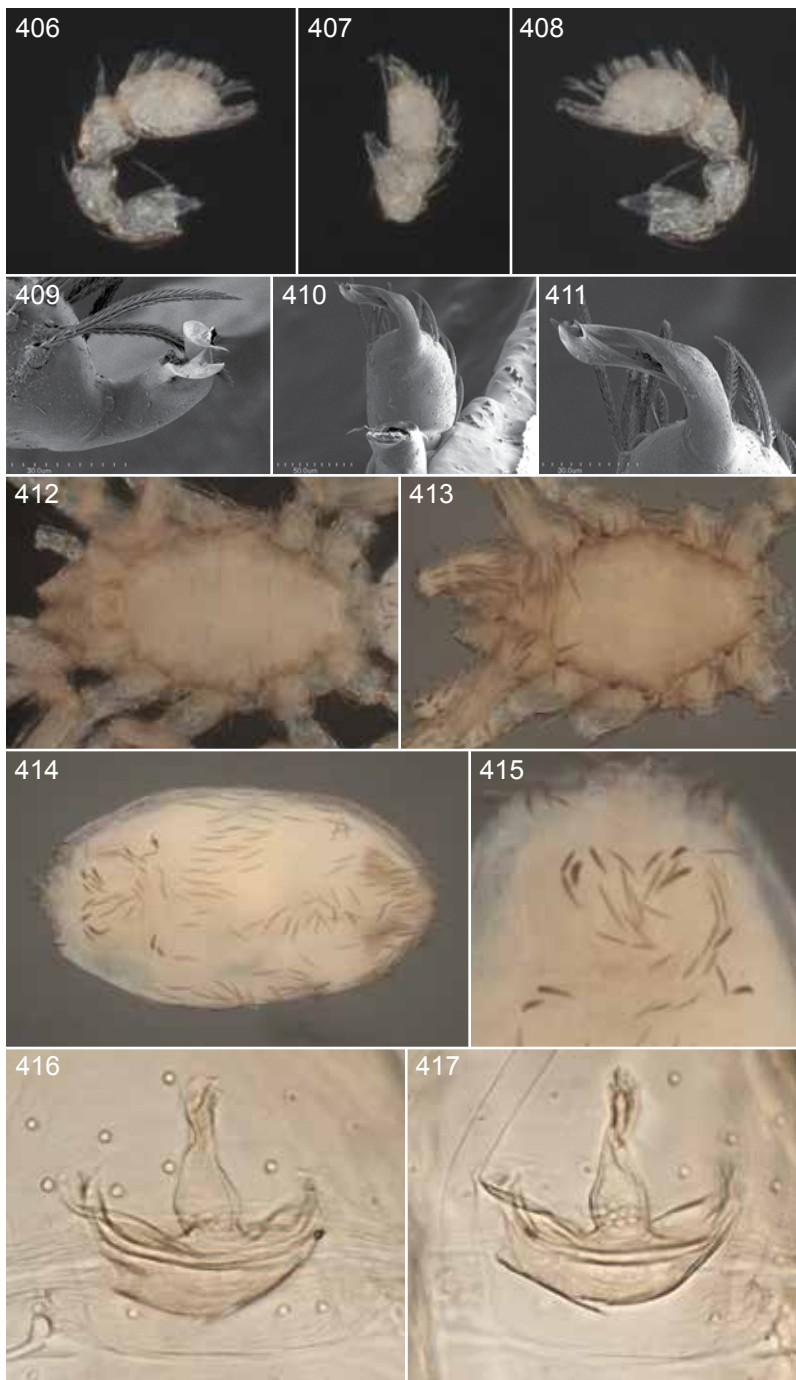
FIGURES 365–375. 365–371. *Khamiscar anta*, new species, female. 372–375. *K. maro*, new species, female. 365. Tarsal organ of leg III, dorsal view. 366. Same, leg IV. 367. Same, palp. 368, 372. Sternum, ventral view. 369, 373. Abdomen, same. 370, 374. Genitalia, same. 371, 375. Same, dorsal view.



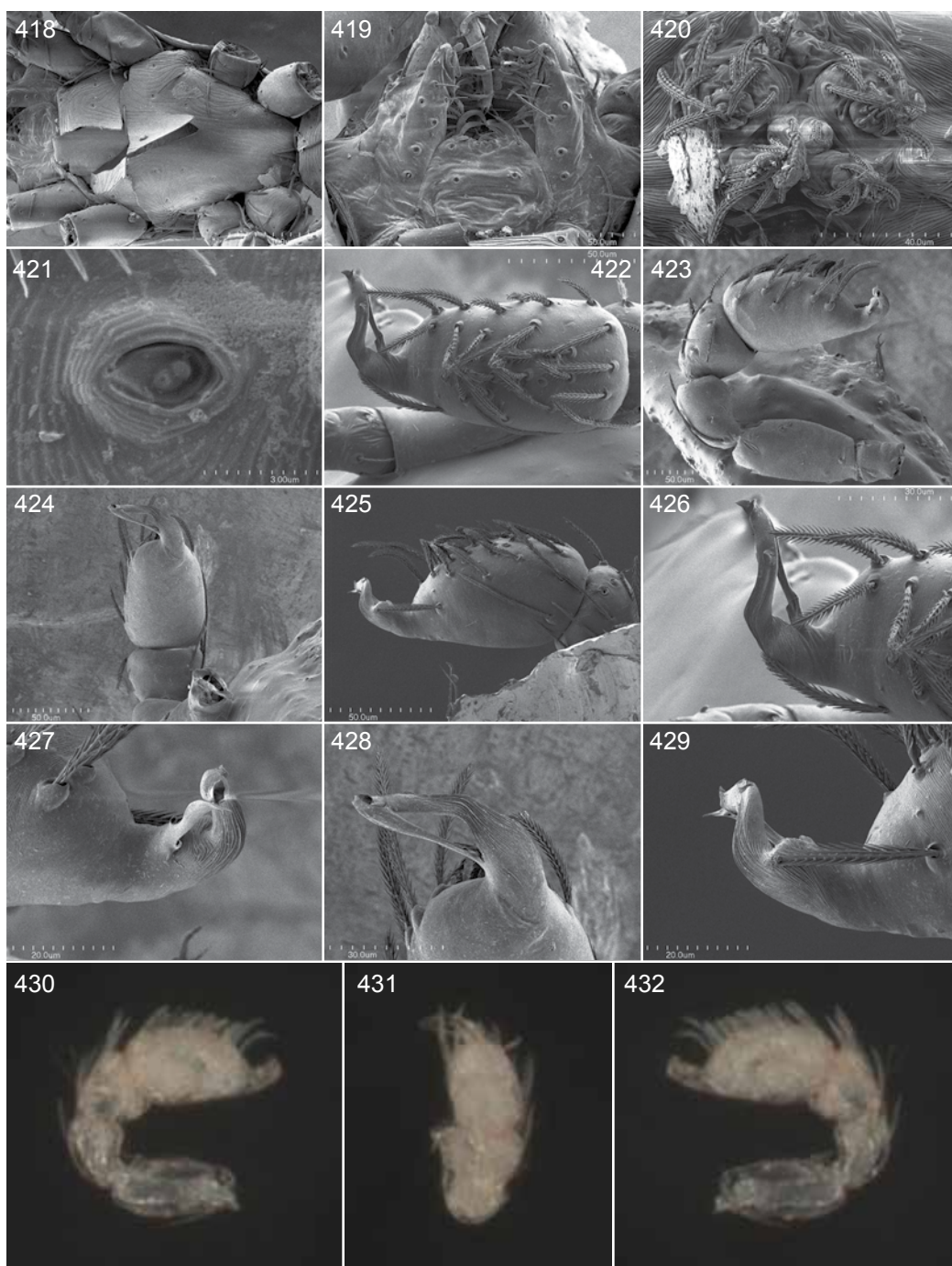
FIGURES 376–390. *Khamiscar maro*, new species, male. 376. Sternum, ventral view. 377. Endites, same. 378. Spinnerets, distal view. 379. Tarsal organ of leg II, dorsal view. 380. Left palp, same. 381, 388. Same, prolateral view. 382, 389. Same, ventral view. 383, 390. Same, retrolateral view. 384. Left embolus, dorsal view. 385. Same, prolateral view. 386. Same, ventral view. 387. Same, retrolateral view.



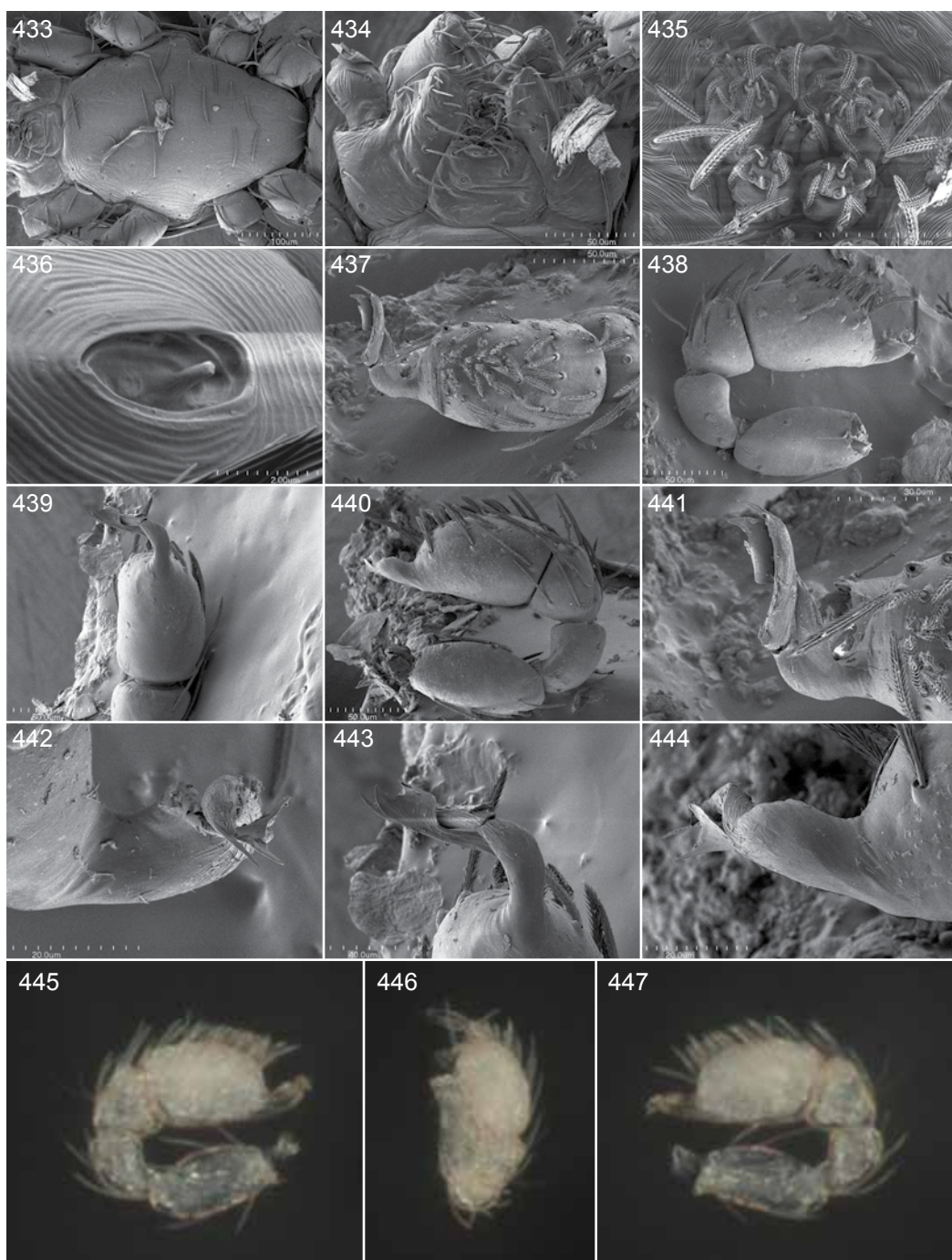
FIGURES 391–405. *Khamiscar tola*, new species, males from Ambohibory. **391.** Sternum, ventral view. **392.** Endites, same. **393.** Spinnerets, distal view. **394.** Tarsal organ of leg II, dorsal view. **395.** Same, leg III. **396.** Same, palp. **397.** Palpal tibia, same. **398.** Left palp, same. **399.** Same, prolateral view. **400.** Same, ventral view. **401.** Same, retrolateral view. **402.** Left embolus, dorsal view. **403.** Same, prolateral view. **404.** Same, ventral view. **405.** Same, retrolateral view.



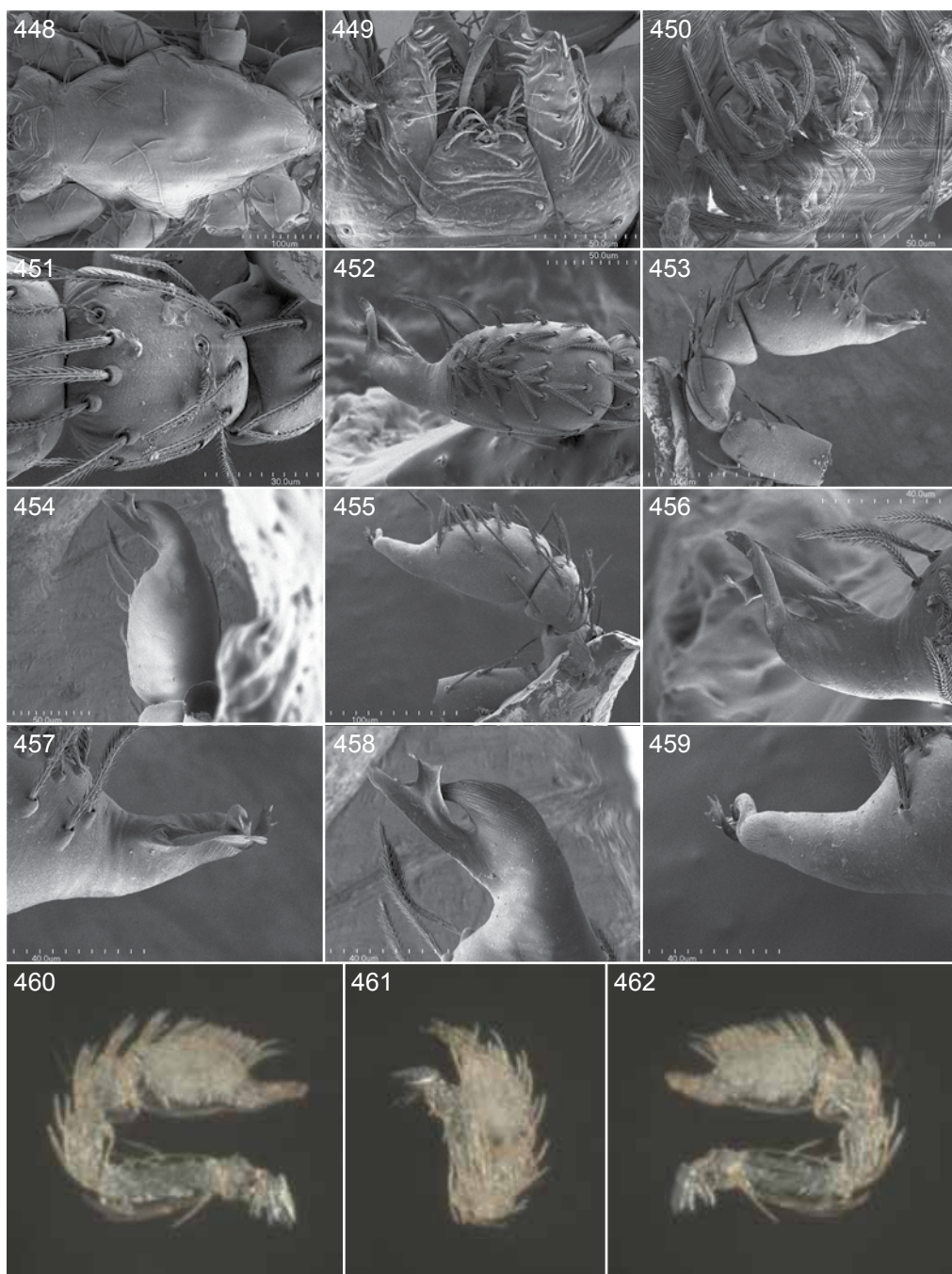
FIGURES 406–417. *Khamiscar tola*, new species, males from Ambohibory (406–408, 412) and Analalava (409–411), female from Ambohibory (413–417). **406.** Left palp, prolateral view. **407, 410.** Same, ventral view. **408.** Same, retrolateral view. **409.** Left embolus, prolateral view. **411.** Same, ventral view. **412, 413.** Sternum, ventral view. **414.** Abdomen, same. **415, 416.** Genitalia, same. **417.** Same, dorsal view.



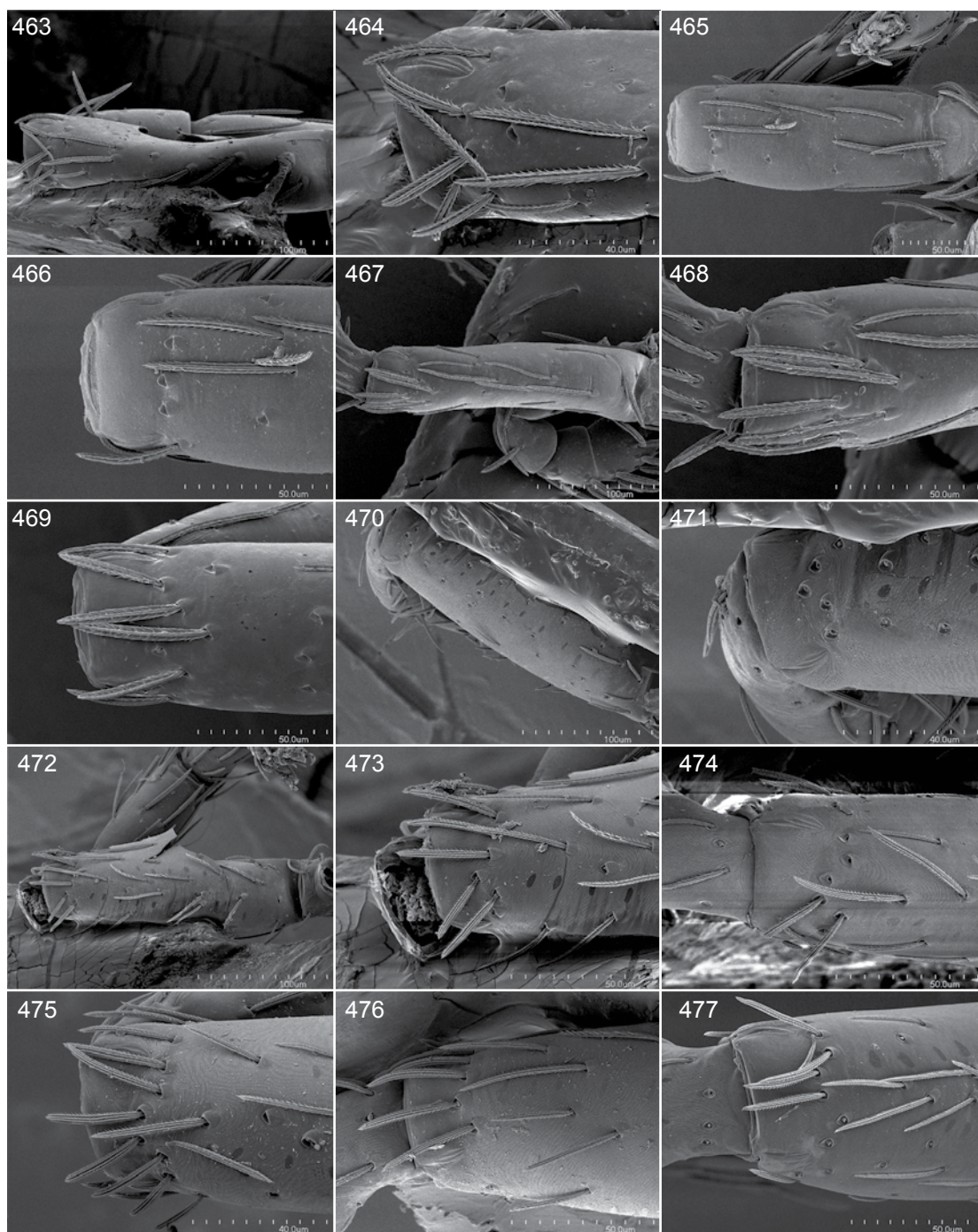
FIGURES 418–432. *Khamiscar kiri*, new species, male. **418.** Sternum, ventral view. **419.** Endites, same. **420.** Spinnerets, distal view. **421.** Tarsal organ of palp, dorsal view. **422.** Left palp, same. **423, 430.** Same, prolateral view. **424, 431.** Same, ventral view. **425, 432.** Same, retrolateral view. **426.** Left embolus, dorsal view. **427.** Same, prolateral view. **428.** Same, ventral view. **429.** Same, retrolateral view.



FIGURES 433–447. *Khamiscar baly*, new species, male. **433.** Sternum, ventral view. **434.** Endites, same. **435.** Spinnerets, distal view. **436.** Tarsal organ of leg I, dorsal view. **437.** Left palp, same. **438, 445.** Same, prolateral view. **439, 446.** Same, ventral view. **440, 447.** Same, retrolateral view. **441.** Left embolus, dorsal view. **442.** Same, prolateral view. **443.** Same, ventral view. **444.** Same, retrolateral view.



FIGURES 448–462. *Khamiscar ambi*, new species, male. **448.** Sternum, ventral view. **449.** Endites, same. **450.** Spinnerets, distal view. **451.** Palpal tibia, dorsal view. **452.** Left palp, same. **453, 460.** Same, prolateral view. **454, 461.** Same, ventral view. **455, 462.** Same, retrolateral view. **456.** Left embolus, dorsal view. **457.** Same, prolateral view. **458.** Same, ventral view. **459.** Same, retrolateral view.



FIGURES 463–477. Dorsal view of leg femora. 463–469. *Khamiscar anta*, new species, male (463–466) and female (467–469). 470–473. *Khamisoides calabash*, new species, male. 474–477. *Khamisoides edwardsi*, new species, female. **463, 467.** Femur I. **464, 468, 474.** Tip of femur I. **465, 472.** Femur III. **466, 473, 476.** Tip of femur III. **469, 477.** Tip of femur IV. **470.** Femur II. **471, 475.** Tip of femur II.

MALE (PBI_OON 2354, figs. 376–390): Total length 0.94. Endites with subterminal ridge. Conductor narrow, deeply bifid, both prongs long, narrow.

FEMALE (PBI_OON 2354, figs. 372–375): Total length 0.99. Anterior receptaculum short, with widened, flattened tip.

OTHER MATERIAL EXAMINED: MADAGASCAR: **Toliara**: *Anosy*: Reserve Spéciale de Cap Sainte Marie, 12.3 km 262° W Marovato, 25°34'54"S, 45°10'06"E, Feb. 11–15, 2002, spiny forest/thicket, sifted litter (leaf mold, rotten wood), elev. 200 m (B. Fisher et al., CAS 11375, PBI_OON 2358), 1 ♂, 2 ♀.

DISTRIBUTION: Southern Madagascar.

Khamiscar tola, new species

Figures 391–417

TYPES: Male holotype, female allotype, two male paratypes, and two female paratypes from sifted litter and rotten wood taken in a tropical dry forest at an elevation of 300 m in the Parc National d'Andohahela, Forêt d'Ambohibory, 1.7 km 61° ENE Tsimelamy, 36.1 km 308° NW Tolagnaro, 24°55'48"S, 46°38'44"E (Jan. 16–20, 2002; B. Fisher et al.), deposited in CAS (10338, PBI_OON 2363).

ETYMOLOGY: The specific name is a noun in apposition shortened from the type locality.

DIAGNOSIS: Males are most easily recognized by the shape of the palpal conductor in ventral view (fig. 404): the base is long and narrow, and the tip is widely expanded, with a U-shaped terminal excavation between the prongs. Females have a long anterior receptaculum that is narrowed at about two-thirds its length (fig. 417).

MALE (PBI_OON 2363, figs. 391–412): Total length 0.97. Endites with subterminal ridge. Conductor shallowly bifid, with scooped tip.

FEMALE (PBI_OON 2363, figs. 413–417): Total length 1.36. Anterior receptaculum long, narrowed at about two-thirds its length.

OTHER MATERIAL EXAMINED: MADAGASCAR: **Fianarantsoa**: *Ihorombe*: Forêt d'Analava, 29.6 km 280° W Ranohira, 22°35'30"S, 45°07'42"E, Feb. 1–5, 2003, tropical dry forest, malaise trap, elev. 700 m (C. Griswold et al., CAS 11445, PBI_OON 2343), 1 ♂. **Toliara**: *Anosy*: Parc National d'Andohahela, Forêt d'Ambohibory, 1.7 km 61° ENE Tsimelamy, 36.1 km 308° NW Tolagnaro, 24°55'48"S, 46°38'44"E, Jan. 16–20, 2002, tropical dry forest, sifted litter (leaf mold, rotten wood), elev. 300 m (B. Fisher et al., CAS 11357, PBI_OON 1992), 3 ♂, 2 ♀; Réserve Privé Berenty, Forêt de Bealoka, Mandraré River, 14.6 km 329° NW Amboasary, 24°57'25"S, 46°16'17"E, Feb. 3–8, 2002, gallery forest, sifted litter (leaf mold, rotten wood), elev. 35 m (B. Fisher et al., CAS 10280, PBI_OON 2352), 1 ♀; Réserve Privé Berenty, Forêt de Malaza, Mandraré River, 8.6 km 314° NW Amboasary, 25°00'28"S, 46°18'22"E, Feb. 6, 2002, gallery forest, sifted litter (leaf mold, rotten wood), elev. 40 m (B. Fisher et al., CAS 10302, PBI_OON 2357), 2 ♀.

DISTRIBUTION: Southeastern Madagascar; despite the distance between the localities in Fianarantsoa and Toliara, no significant differences were detected (cf. figs. 406–412).

Khamiscar kiri, new species

Figures 418–432

TYPES: Male holotype and six male paratypes from sifted litter and rotten wood taken in a tropical dry forest at an elevation of 100 m in the Forêt de Kirindy, 15.5 km 64° ENE

Marofandilia, 20°02'42"S, 44°39'44"E, Menaby, Toliara, Madagascar (Nov. 28–Dec. 3, 2001; B. Fisher et al.), deposited in CAS (10351, PBI_OON 2362).

ETYMOLOGY: The specific name is a noun in apposition shortened from the type locality.

DIAGNOSIS: Males are most easily recognized by the shape of the palpal conductor in ventral view (fig. 428): the base is very long and narrow, and the tip is only slightly expanded and scooped.

MALE (PBI_OON 2362, figs. 418–432): Total length 0.80. Endites distally narrowed, with two subterminal ridges. Conductor long, narrow throughout most of its length, tip only shallowly bifid.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: West-central Madagascar.

***Khamiscar baly*, new species**

Figures 433–447

TYPE: Male holotype from sifted litter and rotten wood taken in a tropical dry forest at an elevation of 10 m in the Park National de Baie de Baly, 12.4 km 337° NNW Soalala, 16°00'36"S, 45°15'54"E, Boeny, Mahajanga, Madagascar (Nov. 26–30, 2002; B. Fisher et al.), deposited in CAS (11515, PBI_OON 2344).

ETYMOLOGY: The specific name is a noun in apposition shortened from the type locality.

DIAGNOSIS: Males are most easily recognized by the shape of the palpal conductor in ventral view (fig. 443): the tip is greatly expanded, with a notched prolateral margin.

MALE (PBI_OON 2344, figs. 433–447): Total length 0.89. Endites with longitudinal subterminal ridge. Conductor with broadly expanded, squarely notched tip.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Northwestern Madagascar.

***Khamiscar ambi*, new species**

Figures 448–462

TYPE: Male holotype from sifted litter and rotten wood taken in a rainforest at an elevation of 600 m on the Montagne d'Akirindro, 7.6 km 341° NNW Ambinanitelo, 15°17'18"S, 49°32'54"E, Analanjirofo, Toamasina, Madagascar (Mar. 17–21, 2003; C. Griswold et al.), deposited in CAS (11683, PBI_OON 2345).

ETYMOLOGY: The specific name is a noun in apposition shortened from the type locality.

DIAGNOSIS: Males are most easily recognized by the shape of the palpal conductor in ventral view (fig. 458): the dorsal prong has an expanded tip.

MALE (PBI_OON 2345, figs. 448–462): Total length 0.95. Endites with subterminal ridge. Conductor with V-shaped distal excavation, dorsal prong with thin distal extension.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Northeastern Madagascar.

Khamisoides, new genus

TYPE SPECIES: *Khamisoides edwardsi*, new species.

ETYMOLOGY: The generic name refers to the similarities to *Khamisia*, and is masculine in gender.

DIAGNOSIS: The combined presence of sternal extensions widely separating coxae II and III (figs. 478, 499) plus only two eyes (figs. 496, 538) easily separates members of this genus from all other oonopids. These species all seem to have only five spinnerets, with the posterior median pair fused into a single structure (figs. 513, 515); similarly fused spinnerets are known only in a few species of the distantly related genus *Escaphiella* Platnick and Dupérré (2009b). The female genitalia have unique, anteriorly directed apodemes that extend almost to the pedicel (figs. 531, 578, 598). The male palps have a distinctive prolateral lobe originating subdistally on the embolus (figs. 487, 552, 589); the lobes are not heavily sclerotized, and can vary in appearance even among specimens collected at the same time. Depending on the conditions under which the palps are prepared for imaging, the lobes can be collapsed against the base of the embolus, erect and flag-like, or even erect and somewhat inflated. Similarly, the embolus tips, which are somewhat more heavily sclerotized, can twist or curl during critical point drying, making comparing images difficult. Luckily, as in some other oonopid genera, such as *Hexapopha* Platnick and Berniker (2014b), the male endites are fully as species specific as are the palps.

DESCRIPTION: Total length of males 1.2–1.4, of females 1.1–1.4. Cephalothorax and appendages yellow, without pattern, abdomen white except for pale yellow ventral scuta, without pattern. **Cephalothorax:** Carapace elongated hexagonal in dorsal view (figs. 493, 537), pars cephalica flat in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, anterolateral corners with slightly sclerotized triangular projections, pars thoracica with rounded posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes, surface of elevated portion of pars cephalica wrinkled, with scattered platelets (figs. 493, 537), sides finely reticulate (figs. 495, 539), fovea absent, lateral margin straight, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal setae absent, nonmarginal pars cephalica, pars thoracica setae dark, needle-like, scattered. Clypeus margin slightly rebordered (figs. 496, 538), clypeus sinuous in front view, sloping forward in lateral view, high, ALE separated from edge of carapace by their radius or more (fig. 494), median projection absent; setae dark, needlelike. Chilum absent. Eyes two, well developed, ALE oval, separated by less than their radius. Sternum longer than wide, not fused to carapace, median concavity absent, with radial furrows between coxae I-II, II-III, III-IV, furrows smooth, radial furrow opposite coxae III absent, surface of males smooth (fig. 542), of females laterally smooth, medially wrinkled (fig. 499), without pits, microsculpture absent, sickle-shaped structures absent, anterior margin with semicircular depression in middle half, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae II and III much greater than distance between coxae I and II or coxae III and IV (figs. 532, 592), extensions of precoxal triangles absent, lateral margins with rounded extensions between

coxae, without posterior hump; setae sparse, dark, needlelike, densest laterally, originating from surface; hair tufts absent. Chelicerae straight, anterior face strongly reticulate (figs. 497, 540); without teeth on promargin or retromargin; fangs without toothlike projections, elongated, directed posteriorly, without prominent basal process, tip with elongated venom gland opening (figs. 498, 541), setae dark, needlelike, densest medially; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed (figs. 497, 540), posterior surface unmodified, promargin with row of flattened setae, inner margin unmodified, laminate groove absent. Labium triangular, fused to sternum laterally (figs. 500, 543), anterior margin indented at middle (figs. 501, 543), same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally not excavated, same as sternum in sclerotization, serrula absent in males (fig. 544), present as single row of teeth in females (figs. 502, 503), anteromedian tip of males with narrow anterior extensions (figs. 533, 543), flattened setae on tip with forklike tines, posteromedian part unmodified. Labrum with flattened, triangular basal projection (figs. 504, 545). Female palp without claw or spines (figs. 506, 507); patella without prolateral row of ridges; tibia with three trichobothria (fig. 505), tarsus unmodified. **Abdomen:** Cylindrical, without long posterior extension, but females often with contents shrunken, leaving empty space under cuticle (fig. 596), rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent posteriorly. Book lung covers large, ovoid, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove (figs. 508, 555). Pedicel tube short, unmodified, scutopedicel region unmodified, scutum not extending far dorsal of pedicel, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum absent. Epigastric scutum weakly sclerotized, not surrounding pedicel, not protruding, small lateral sclerites absent, scutum of females without lateral joints. Postepigastric scutum weakly sclerotized, short, only around epigastric furrow, not fused to epigastric scutum (fig. 578), anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum absent. Supraanal scutum absent. Abdominal setae dark, needlelike, epigastric area setae not basally thickened. Dense patch of setae anterior to spinnerets absent. Colulus present. Five spinnerets, anterior laterals bisegmented, basal segment with oblique membranous strip (figs. 512, 556), posterior medians fused (fig. 513), posterior laterals bisegmented (fig. 557), anterior laterals with one major ampullate gland spigot and three piriform gland spigots (figs. 514, 558), posterior median with one terminal spigot (figs. 515, 559), posterior laterals with one terminal spigot (figs. 516, 560). **Legs:** Femora without subdistal constriction or subdistal transverse row of setae (figs. 470–477); femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex, ventral scopula both absent, metatarsi I, II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent. Leg spines absent. Tarsi I to IV without inferior claw. Superior claws of anterior legs with outer row of three or four large, blunt-tipped teeth, inner row with distal series of closely spaced, narrow teeth (figs. 517, 518, 521, 522, 562, 563, 566, 567), of posterior legs with single row of about four large, basally situated teeth (figs. 519, 520, 523, 524, 564, 565, 568, 569). Tarsal organs with

single long, raised receptor, proximal portion flat, distal portion erect (figs. 526–530, 570–574). Trichobothrial base with two lobes on each side (figs. 525, 561). **Genitalia:** Male epigastric region with sperm pore not visible; furrow without Ω -shaped insertions, without setae. Male palp normal size, not strongly sclerotized, right and left palps mirror images; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria (fig. 546); cymbium ovoid in dorsal view (fig. 547), completely fused with bulb, no seam visible (figs. 548–550), not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent; bulb 1–1.5 times as long as cymbium, stout, spherical; embolus light (figs. 575–577), without prolateral excavation, embolus with subdistal prolateral lobe (figs. 551–554). Females with two lateral anterior receptacula (figs. 509, 535, 536), long, narrow posterior receptaculum (fig. 510), strong lateral apodemes directed anteriorly (figs. 511, 531).

DISTRIBUTION: Virgin Islands.

Key to Species of *Khamisoides*

1. Anterior extensions on male endites abruptly bent at about half their length (figs. 479, 480); female genitalic apodemes about three times as long as receptacula (fig. 536). . . . *edwardsi*
- Anterior extensions on endites smoothly arched (figs. 543, 582); female genitalic apodemes less than twice as long as receptacula (figs. 580, 600) 2
2. Embolus with narrow base (fig. 591); female genitalic apodemes without sclerotized enlargement anterior of receptacula (fig. 600); St. Croix *muchmorei*
- Embolus with wider base (fig. 554); female genitalic apodemes with sclerotized enlargement anterior of receptacula (fig. 580); St. John *calabash*

Khamisoides edwardsi, new species

Figures 474–536

TYPE: Male holotype from Berlese sample of litter taken among rocks in gut near Butler's house at Coral Bay, St. John, Virgin Islands (July 19, 1975; W. Muchmore), deposited in AMNH (PBI_OON 1436).

ETYMOLOGY: The specific name is a patronym in honor of G.B. Edwards of the Florida State Collection of Arthropods, who first recognized the genus as new.

DIAGNOSIS: Males are most easily recognized by the shape of the anterior extensions on the endites, which are abruptly bent at about half their length (figs. 479, 480); females have short lateral receptacula and long apodemes (figs. 531, 535, 536).

MALE (PBI_OON 1436, figs. 478–492, 532, 533): Total length 1.25. Endites with long anterior extensions bent laterally at about half their length. Embolus tip deeply bifid.

FEMALE (PBI_OON 1440, figs. 474–477, 493–531, 534–536): Total length 1.32. Lateral receptacula short, ovoid, apodemes very long, narrow throughout their length.

OTHER MATERIAL EXAMINED: VIRGIN ISLANDS: **St. John:** Annaberg Ruins, June 13, 1980, along old walls (W. Muchmore, FSCA PBI_OON 21343), 1 ♂, 1 ♀; Brown Bay, June 19, 1980, base of old stump (W. Muchmore, FSCA PBI_OON 21347), 1 ♀; Cinnamon Bay, Centerline Trail, June 5, 1980, bases of tree (W. Muchmore, FSCA PBI_OON 21344), 1 ♀; Coral Bay, July 17, 1975, Berlese, ground litter above Butler's house (W. Muchmore, AMNH PBI_OON 1439), 1 ♀, gut near Butler's house, July 19, 1975, guano on rock (W. Muchmore, AMNH PBI_OON 49606), 1 ♀, July 22, 1975, Berlese, litter beneath century plant (W. Muchmore, AMNH PBI_OON 1437, 1442), 2 ♂; Denis Bay, June 16, 1980, base of old mill (W. Muchmore, FSCA PBI_OON 21341), 1 ♂; Great Lameshur Bay, May 21, 1979, litter under cactus (W. Muchmore, FSCA PBI_OON 21346), 1 ♀, May 24, 1979, shore litter under mangrove (W. Muchmore, FSCA PBI_OON 26328), 1 ♂, 1 ♀, June 5, 1979, rotten log (W. Muchmore, FSCA PBI_OON 26326), 1 ♀, same, litter among rocks, above shore (W. Muchmore, FSCA PBI_OON 26329), 2 ♂; King Hill, Coral Bay, July 18, 1975, Berlese, litter under rotten log (W. Muchmore, AMNH PBI_OON 1438), 1 ♂; Lameshur Bay, May 15, 1979, litter under large tamarind (W. Muchmore, FSCA PBI_OON 26322), 1 ♂, at Ranger Station, May 18, 1979, litter under *Cereus* (W. Muchmore, FSCA PBI_OON 21340), 1 ♀, at Yawzi Point, May 28, 1979, litter under trees (W. Muchmore, FSCA PBI_OON 21342), 1 ♂, 1 ♀, at Viers, June 3, 1980, under large tamarind tree (W. Muchmore, FSCA PBI_OON 21348), 1 ♀; Little Lameshur Bay, May 18, 1979, litter under large tree near beach (W. Muchmore, FSCA PBI_OON 26323), 1 ♀, same, litter under cactus (W. Muchmore, FSCA PBI_OON 21338), 1 ♂, May 25, 1979, litter among rocks along road (W. Muchmore, FSCA PBI_OON 49623), 1 ♀, June 6, 1979, forest litter (W. Muchmore, FSCA PBI_OON 21350), 1 ♂, June 18, 1980, among rocks near shore (W. Muchmore, FSCA PBI_OON 21345), 1 ♂, 2 ♀; Reef Bay, Trail head, July 20, 1975, Berlese, litter along old wall (W. Muchmore, AMNH PBI_OON 1441), 1 ♂; Trunk Bay, June 8–9, 1980, debris among rocks, logs (W. Muchmore, FSCA PBI_OON 26327), 1 ♀; Windberg Estate, July 27, 1975, debris along old walls (W. Muchmore, AMNH PBI_OON 1440), 1 ♀; Windberg Ruins, May 31, 1979, litter along wall (W. Muchmore, FSCA PBI_OON 26324), 1 ♂.

DISTRIBUTION: St. John, Virgin Islands.

Khamisoides calabash, new species

Figures 470–473, 537–580

TYPES: Male holotype, female allotype, and female paratype from Berlese sample of litter taken around house at Calabash Boom, St. John, Virgin Islands (Oct. 12, 1980; W. Muchmore), deposited in FSCA (PBI_OON 26321).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

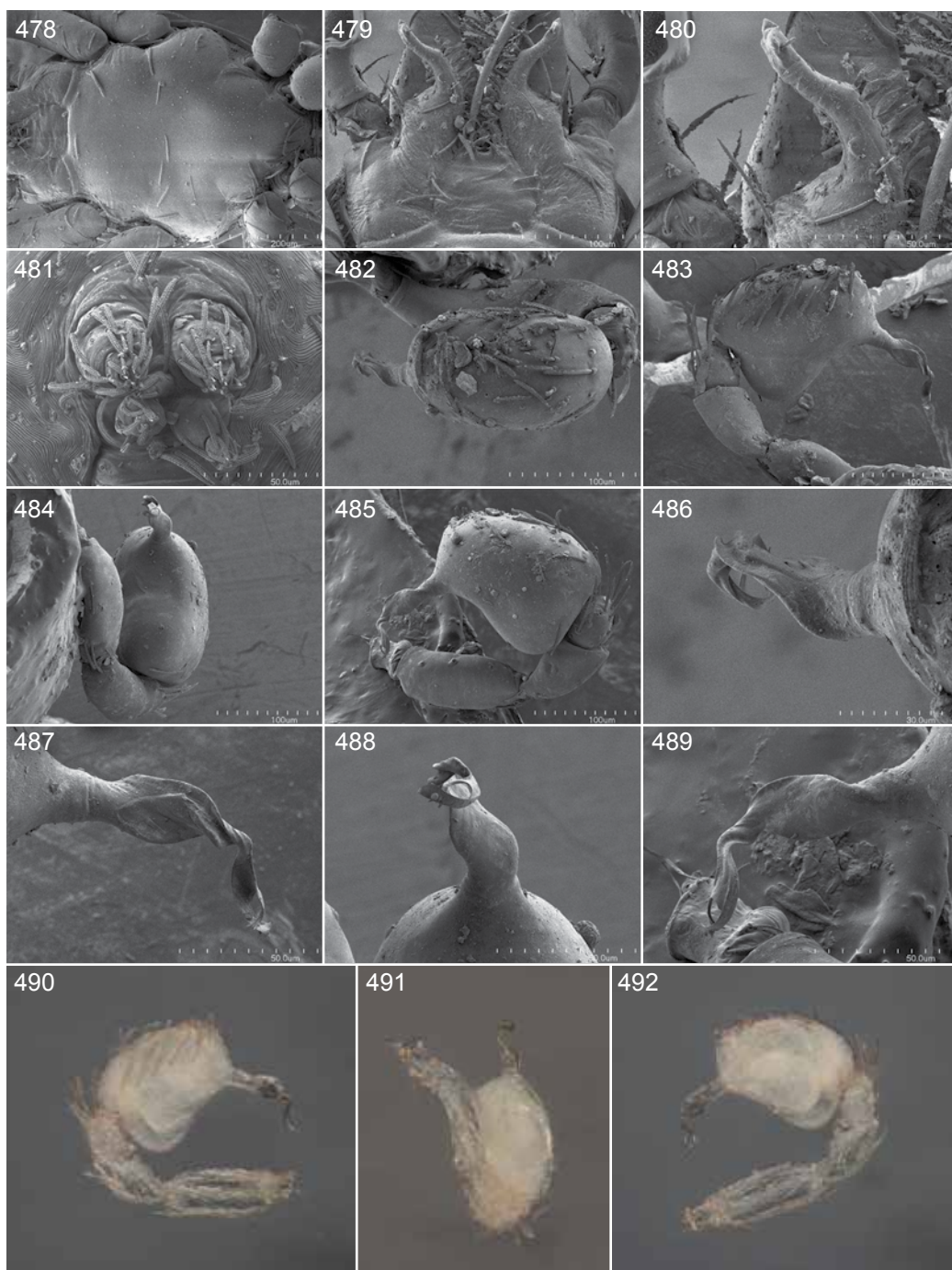
DIAGNOSIS: Males resemble those of *K. muchmorei* in having relatively short endite extensions, but have a wider embolus base (figs. 547–554); females have dorsal sclerotizations on the apodemes, just anterior of the receptacula (figs. 579, 580).

MALE (PBI_OON 26321, figs. 470–473, 537–577): Total length 1.34. Endites with evenly curved anterior extensions. Embolus with wide base.

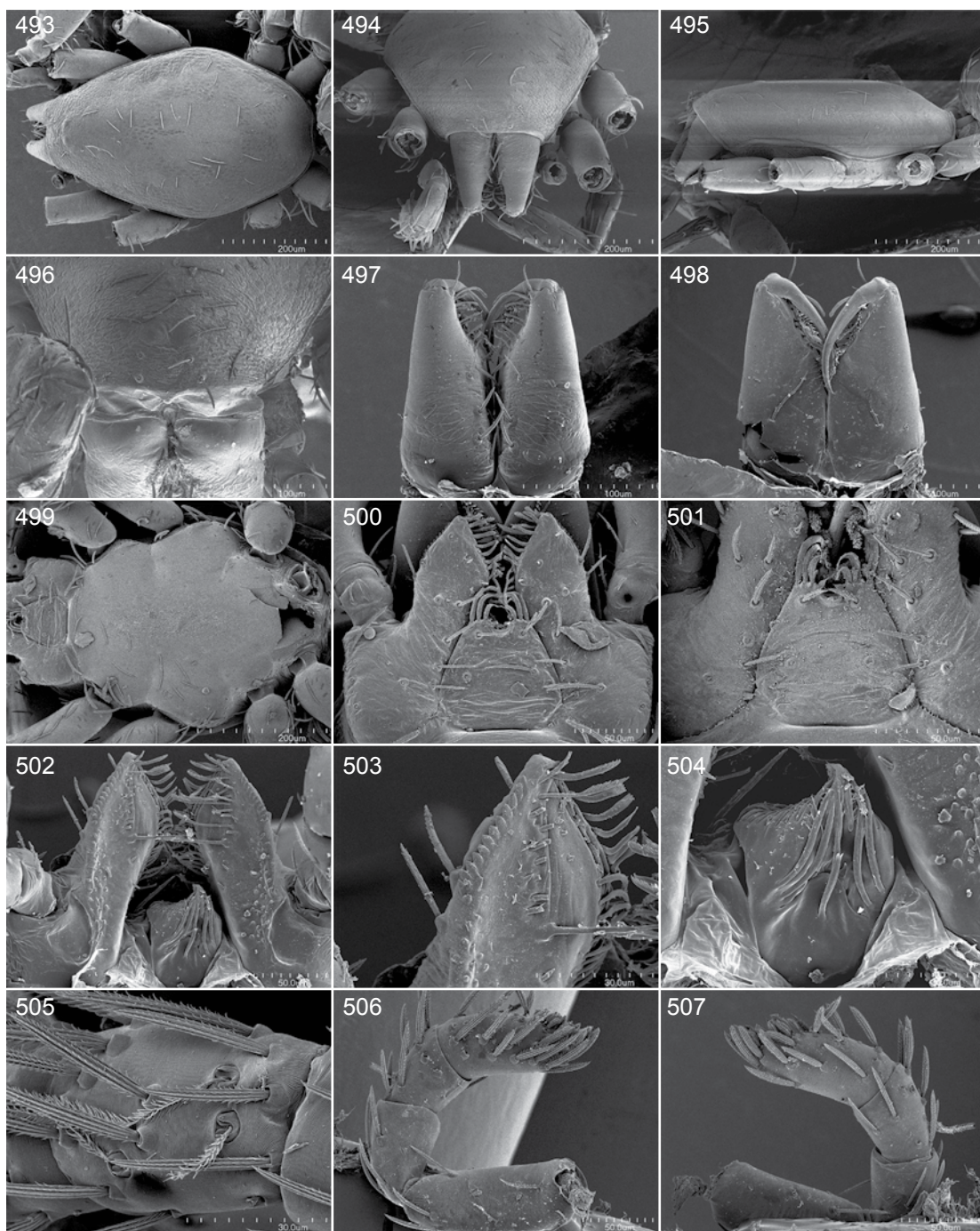
FEMALE (PBI_OON 26321, figs. 578–580): Total length 1.13. Lateral receptacula large, with dorsal ducts, apodemes with dorsal sclerotizations just anterior of receptacula.

OTHER MATERIAL EXAMINED: VIRGIN ISLANDS: **St. John:** Calabash Boom, Oct. 12, 1980, under large tamarind (W. Muchmore, FSCA PBI_OON 21349), 3 ♂, Oct. 13, 1980, leaf litter on hillside (W. Muchmore, FSCA PBI_OON 26325), 1 ♂.

DISTRIBUTION: St. John, Virgin Islands.



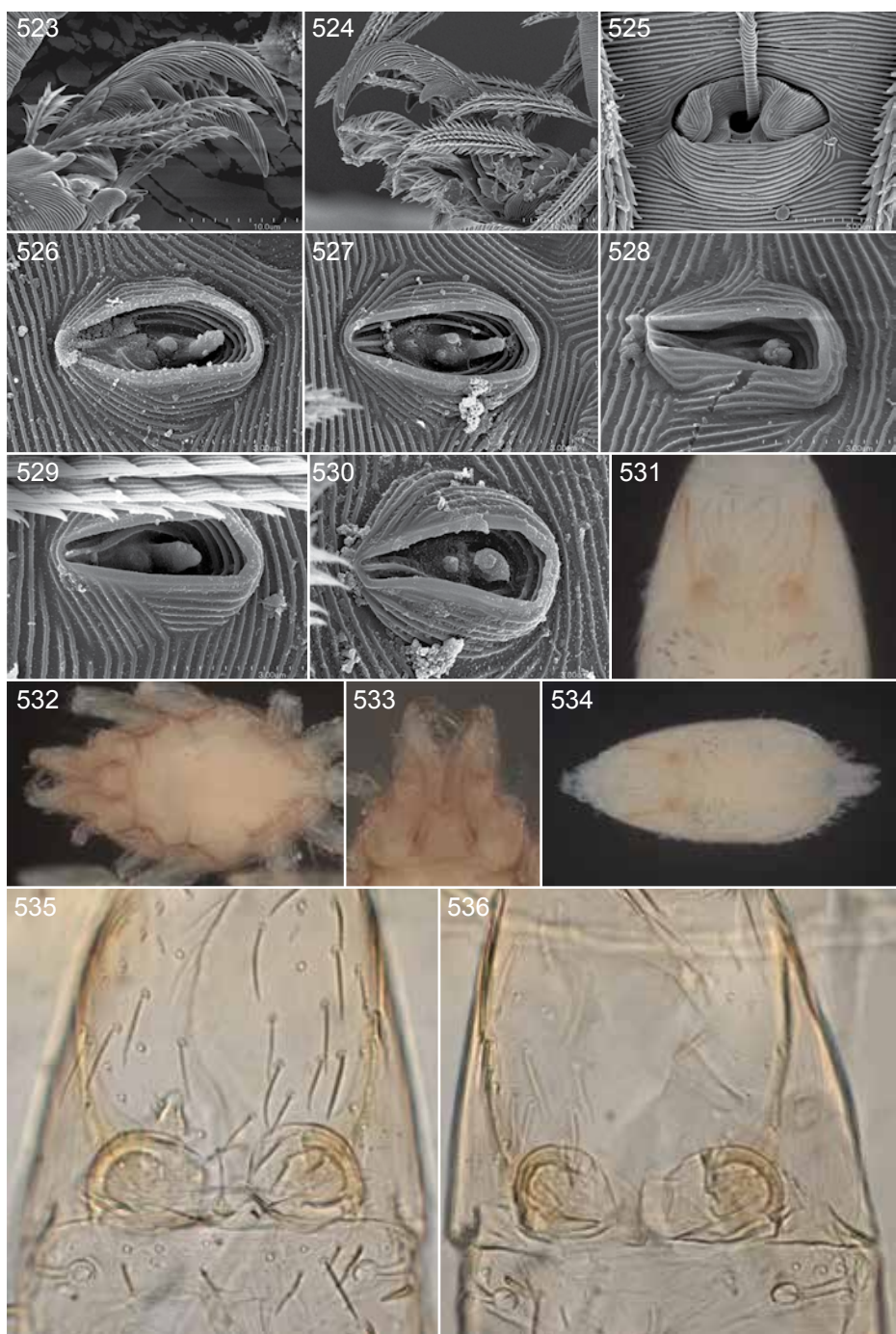
FIGURES 478–492. *Khamisoides edwardsi*, new species, male. **478.** Sternum, ventral view. **479.** Endites, same. **480.** Tip of endite, same. **481.** Spinnerets, distal view. **482.** Left palp, dorsal view. **483, 490.** Same, prolateral view. **484, 491.** Same, ventral view. **485, 492.** Same, retrolateral view. **486.** Left embolus, dorsal view. **487.** Same, prolateral view. **488.** Same, ventral view. **489.** Same, retrolateral view.



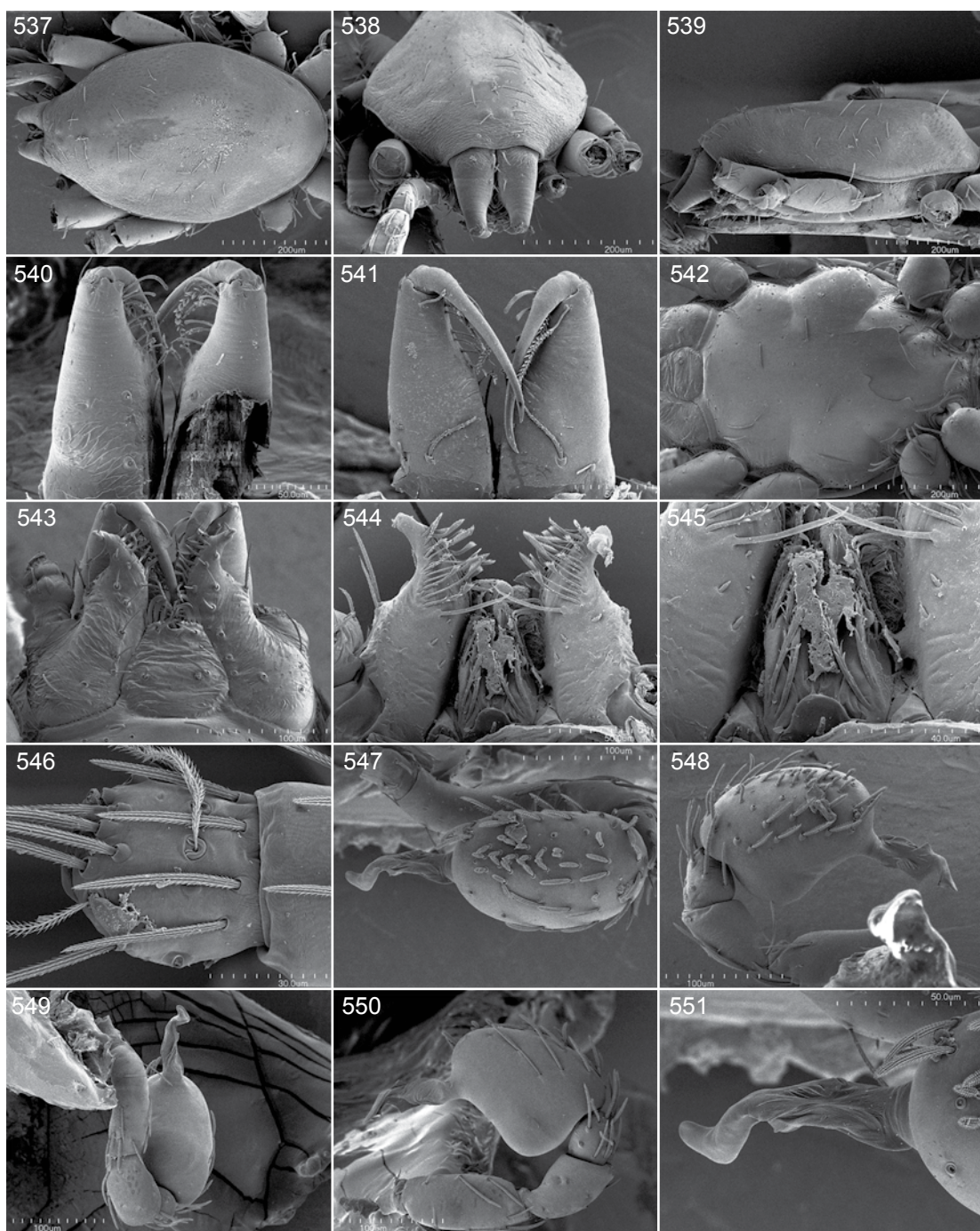
FIGURES 493–507. *Khamisoides edwardsi*, new species, female. **493.** Carapace, dorsal view. **494.** Same, anterior view. **495.** Same, lateral view. **496.** Eye group, anterior view. **497.** Chelicerae, same. **498.** Same, posterior view. **499.** Sternum, ventral view. **500.** Mouthparts, same. **501.** Labium, same. **502.** Endites, dorsal view. **503.** Serrula, same. **504.** Labrum, same. **505.** Palpal tibia, same. **506.** Palp, prolateral view. **507.** Same, retrolateral view.



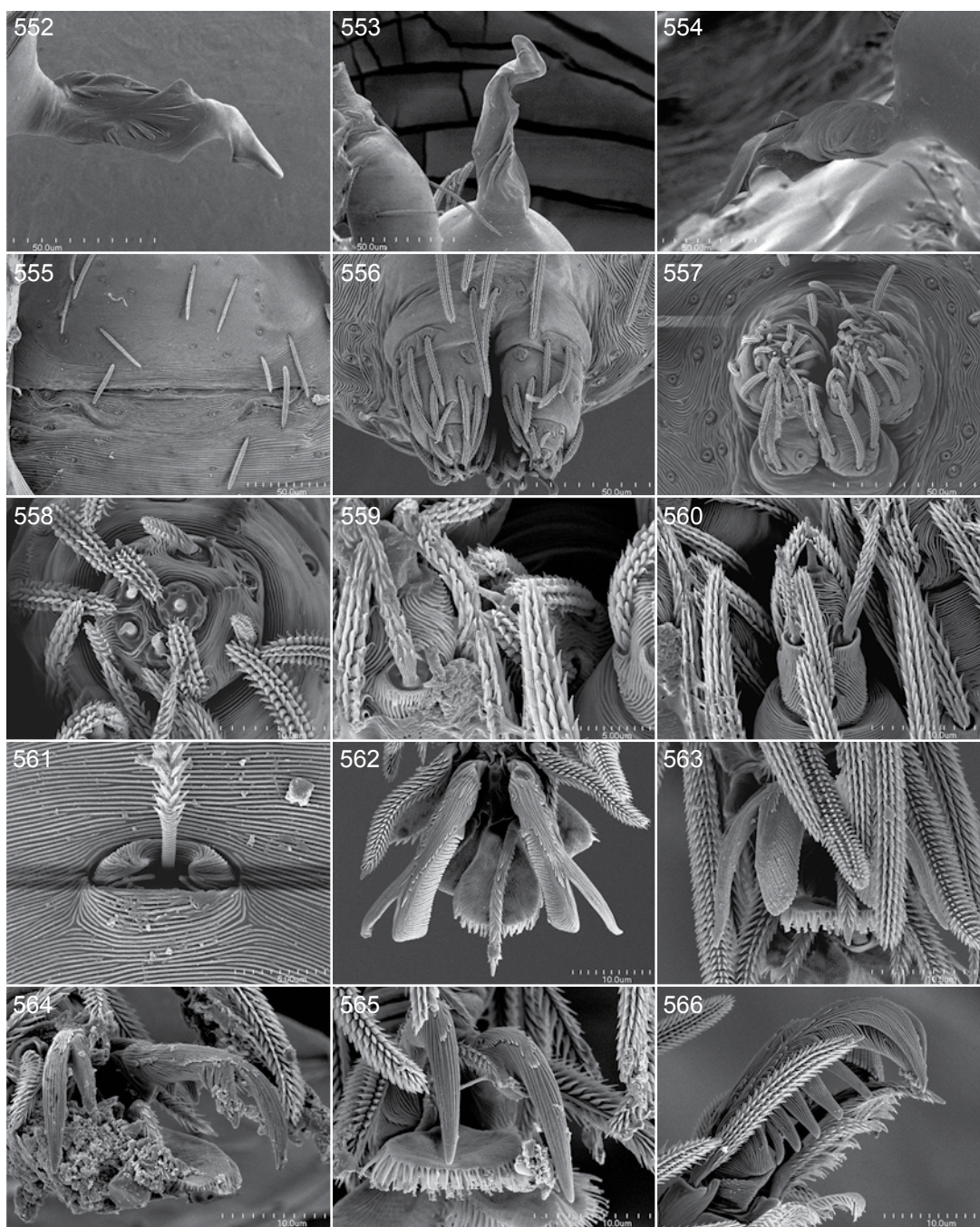
FIGURES 508–522. *Khamisoides edwardsi*, new species, female. 508. Epigastric area, ventral view. 509. Internal genitalia, dorsal view. 510. Anterior receptaculum, same. 511. Genitalic apodeme, same. 512. Spinnerets, ventral view. 513. Same, distal view. 514. Anterior lateral spinneret, same. 515. Posterior median spinneret, same. 516. Posterior lateral spinneret, same. 517. Claws of leg I, distal view. 518. Same, leg II. 519. Same, leg III. 520. Same, leg IV. 521. Claws of leg I, lateral view. 522. Same, leg II.



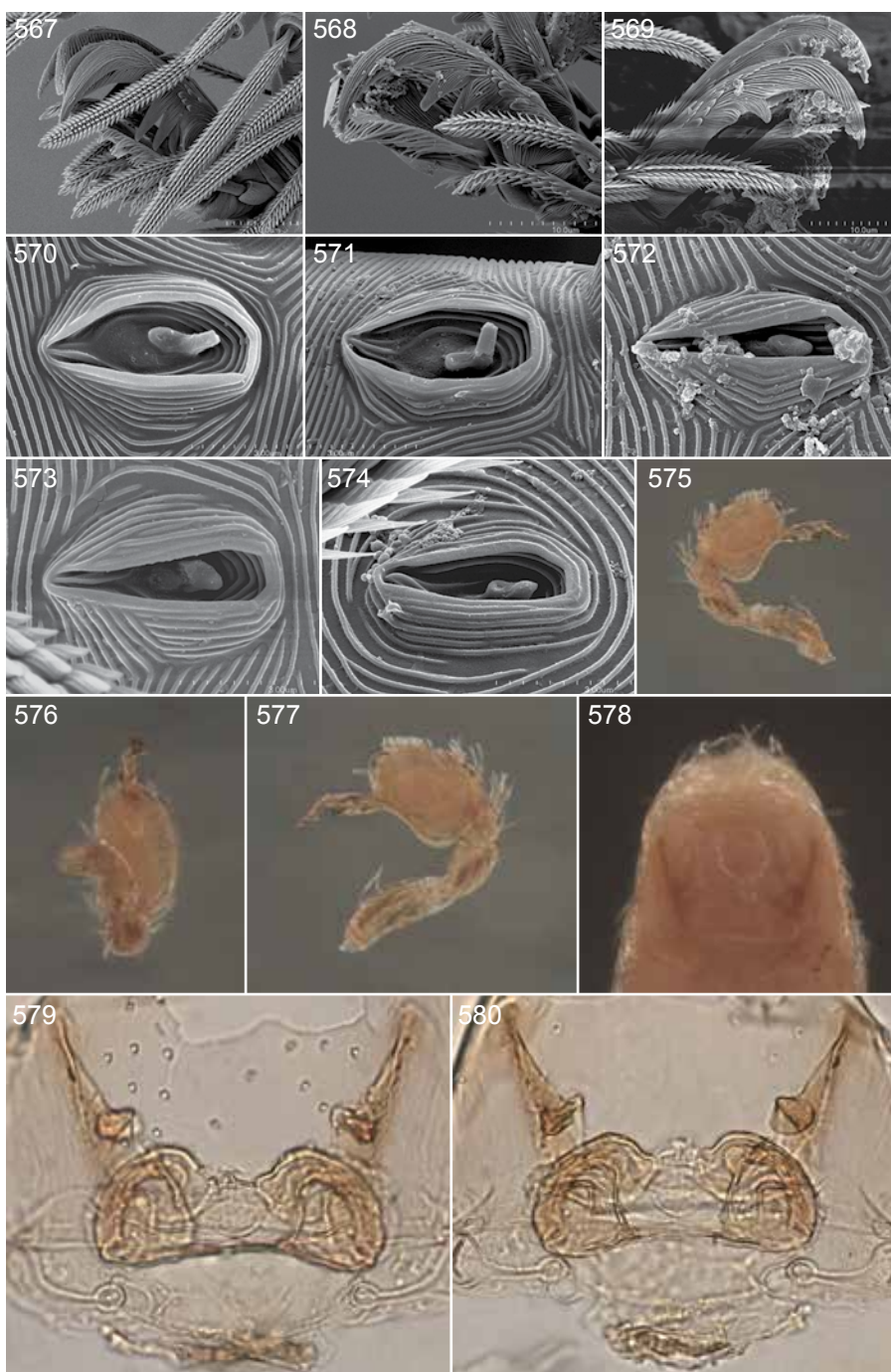
FIGURES 523–536. *Khamisoides edwardsi*, new species, male (532, 533) and female (523–531, 534–536). **523.** Claws of leg III, lateral view. **524.** Same, leg IV. **525.** Trichobothrial base from metatarsus III, dorsal view. **526.** Tarsal organ of leg I, dorsal view. **527.** Same, leg II. **528.** Same, leg III. **529.** Same, leg IV. **530.** Same, palp. **531, 535.** Genitalia, ventral view. **532.** Sternum, same. **533.** Endites, same. **534.** Abdomen, same. **536.** Genitalia, dorsal view.



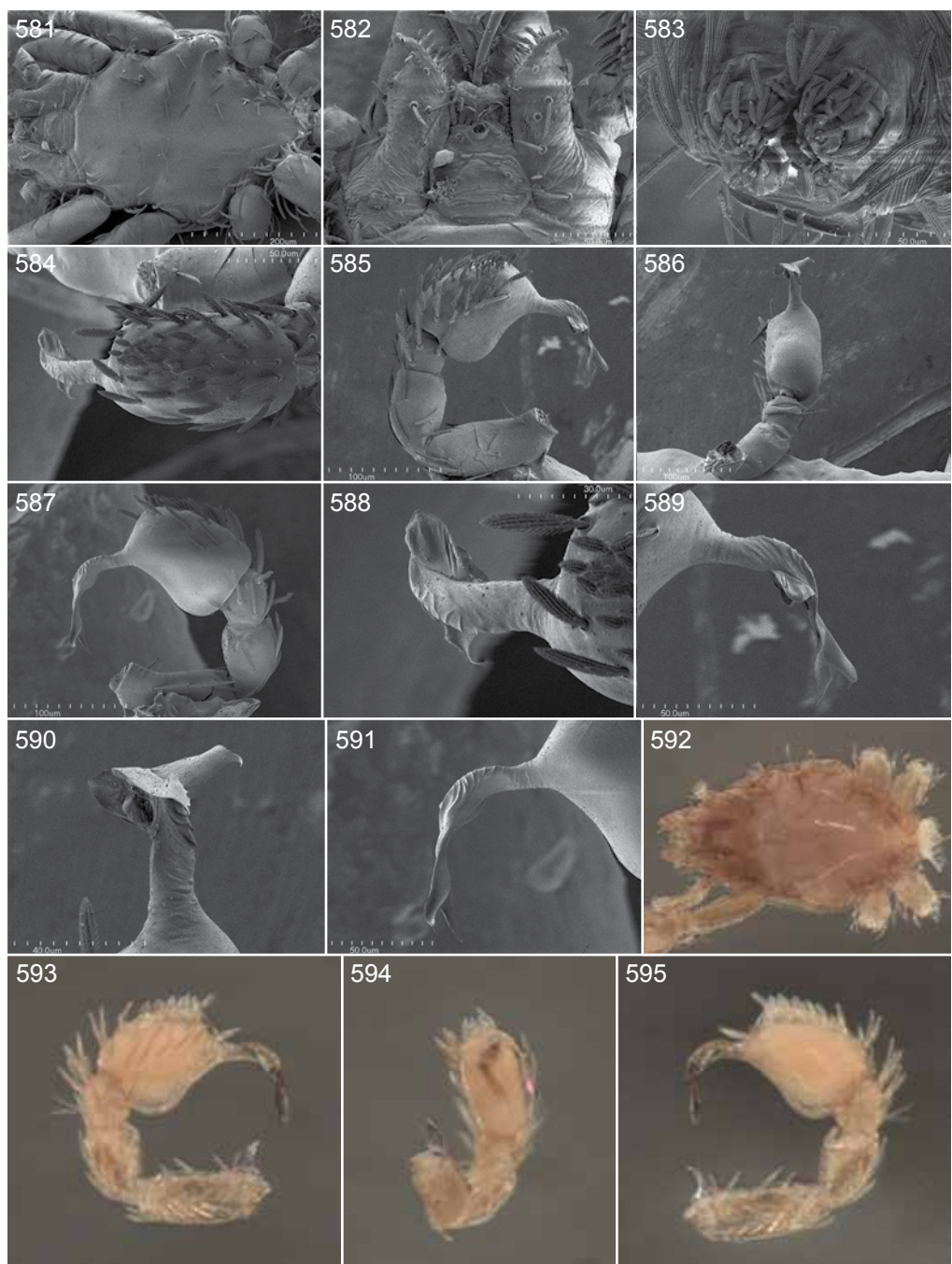
FIGURES 537–551. *Khamisoides calabash*, new species, male. 537. Carapace, dorsal view. 538. Same, anterior view. 539. Same, lateral view. 540. Chelicerae, anterior view. 541. Same, posterior view. 542. Sternum, ventral view. 543. Endites, same. 544. Same, dorsal view. 545. Labrum, same. 546. Palpal tibia, same. 547. Left palp, same. 548. Same, prolateral view. 549. Same, ventral view. 550. Same, retrolateral view. 551. Left embolus, dorsal view.



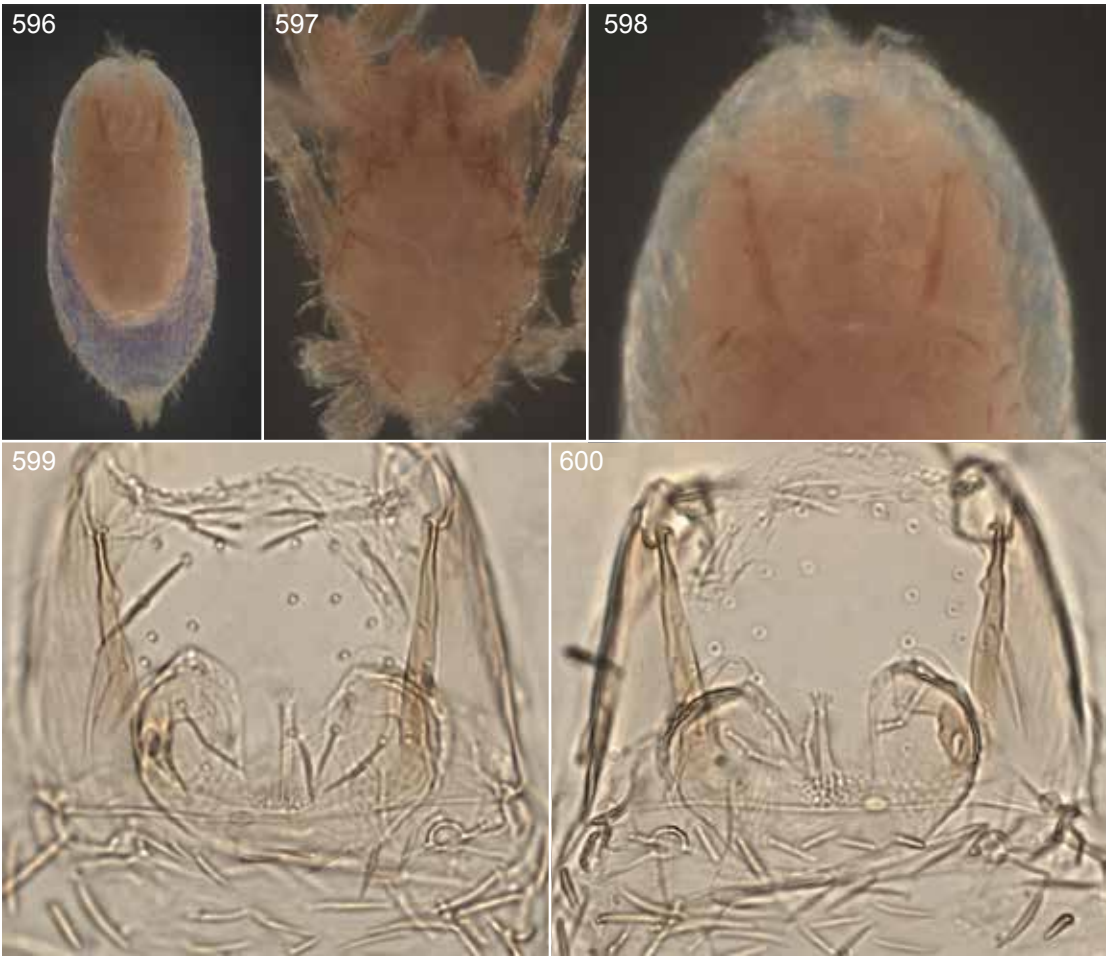
FIGURES 552–566. *Khamisoides calabash*, new species, male. 552, Left embolus, prolateral view. 553. Same, ventral view. 554. Same, retrolateral view. 555. Epigastric region, ventral view. 556. Spinnerets, same. 557. Same, distal view. 558. Anterior lateral spinneret, same. 559. Posterior median spinneret, same. 560. Posterior lateral spinneret, same. 561. Trichobothrial base from metatarsus II, dorsal view. 562. Claws of leg I, distal view. 563. Same, leg II. 564. Same, leg III. 565. Same, leg IV. 566. Claws of leg I, lateral view.



FIGURES 567–580. *Khamisoides calabash*, new species, male (567–577) and female (578–580). **567.** Claws of leg II, lateral view. **568.** Same, leg III. **569.** Same, Leg IV. **570.** Tarsal organ of leg I, dorsal view. **571.** Same, leg II. **572.** Same, leg III. **573.** Same, leg IV. **574.** Same, palp. **575.** Left palp, prolateral view. **576.** Same, ventral view. **577.** Same, retrolateral view. **578, 579.** Genitalia, ventral view. **580.** Same, dorsal view.



FIGURES 581–595. *Khamisoides muchmorei*, new species, male. **581, 592.** Sternum, ventral view. **582.** Endites, same. **583.** Spinnerets, distal view. **584.** Left palp, dorsal view. **585, 593.** Same, prolateral view. **586, 594.** Same, ventral view. **587, 595.** Same, retrolateral view. **588.** Left embolus, dorsal view. **589.** Same, prolateral view. **590.** Same, ventral view. **591.** Same, retrolateral view.



FIGURES 596–600. *Khamisoides muchmorei*, new species, female. **596.** Abdomen, ventral view. **597.** Sternum, same. **598, 599.** Genitalia, same. **600.** Same, dorsal view.

***Khamisoides muchmorei*, new species**

Figures 581–600

Types: Male holotype, female allotype, two male paratypes, and two female paratypes from Berlese sample of litter taken on Buck Island, St. Croix, Virgin Islands (June 12, 1972; W. Muchmore), deposited in FSCA (PBI_OON 21339).

Etymology: The specific name is a patronym in honor of William Muchmore of the University of Rochester, whose pseudoscorpion litter-sampling program, carried out in the Virgin Islands from 1972–1980, produced all the known specimens of this genus.

Diagnosis: Males resemble those of *K. calabash* in having relatively short endite extensions, but have a narrower embolus base (figs. 584–591); females have large lateral receptacula forming a heart-shaped structure with a median anterior process (figs. 599, 600).

Male (PBI_OON 21339, figs. 581–595): Total length 1.33. Endites with evenly curved anterior extensions. Embolus base very narrow.

Female (PBI_OON 21339, figs. 596–600): Total length 1.18. Lateral receptacula large, together forming heart-shaped structure.

Other material examined: One male (abdomen missing) with same data as types (FSCA PBI_OON 49217).

Distribution: Buck Island, St. Croix, Virgin Islands.

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